

STOMATOPOD CRUSTACEANS FROM PHUKET AND THE ANDAMAN SEA**Shane T. Ahyong¹ and Phaibul Naiyanetr²**¹*Department of Marine Invertebrates, Australian Museum, 6 College St, Sydney,
New South Wales 2000, Australia*²*Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand***ABSTRACT**

The Stomatopoda of Phuket, Thailand, is surveyed based on collections made principally by the Phuket Marine Biological Centre BIOSHELF Cruises. Forty-eight stomatopod species are recorded from Phuket. Twenty-eight species are new records for Phuket, including *Carinosquilla spinosa* sp. nov. Eleven species newly reported from Phuket are also new records for the Andaman Sea, an increase of 16%. *Faughnia formosae*, *Gonodactylellus annularis*, *Oratosquillina manningi*, *Oratosquillina ornata*, *Levisquilla jurichi*, *Clorida gaillardi*, *Cloridina pelamidae*, and *Coronidopsis serenei* are reported outside of the Pacific Ocean for the first time. Eighty-one stomatopod species in 11 families and five superfamilies are now known from the Andaman Sea, representing almost 60% of the Indian Ocean fauna. A checklist of the stomatopods of the Andaman Sea is given.

INTRODUCTION

Knowledge of the stomatopod fauna of the northern Andaman Sea is largely derived from the studies of Wood-Mason (1875), Kemp (1913), Kemp and Chopra (1921) and Tiwari and Biswas (1952), each of whom worked principally with collections now housed in the Zoological Survey of India. The stomatopod fauna of Phuket and surrounding Thai waters is known principally from a study made by Dingle *et al.* (1977), supplemented by Manning (1979), and Naiyanetr (1987, 1989, 1998). Dingle *et al.* (1977) reported 15 species from Phuket, comprising mostly coral-reef gonodactyloids. Additional species were reported from Phuket and the adjacent Andaman Sea by Manning (1979), and Naiyanetr (1987, 1989). To date, 20 species of stomatopod have been recorded from Phuket. The present report is based primarily on collections made by the Phuket Marine Biological Centre BIOSHELF Cruises, supplemented by smaller collections made by various workers. These results more than double the known fauna from Phuket to a total of 48. The

known stomatopod fauna of the Andaman Sea is increased to 81 species in 11 families and five superfamilies.

MATERIALS AND METHODS

Synonymies are restricted to the original citation, primary synonyms and references relevant to the Andaman Sea. All measurements are in millimetres (mm). Terminology and size descriptors generally follow Manning (1969b, 1977, 1978d) and Ahyong (1998). Total length (TL) is measured along the midline from the apex of the rostral plate to the apices of the submedian teeth of the telson. Carapace length (CL) is measured along the midline and excludes the rostral plate. Corneal index (CI) is given as 100CL divided by corneal width. Other abbreviations: antennule (A1), antenna (A2), abdominal somite (AS), maxilliped (MXP), median (MD), intermediate (IM), lateral (LT), marginal (MG), submedian (SM), thoracic somite (TS).

Specimens are deposited in the Phuket Marine Biological Centre (PMBC); Australian Museum, Sydney (AM); Chulalongkorn University Museum

of Zoology (CUMZ); Queensland Museum, Brisbane (QM); Zoological Reference Collection, Raffles Museum, National University of Singapore (ZRC); National Natuurhistorisch Museum, Leiden (NNM); and National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM).

TAXONOMY

Eurysquilloidea Manning, 1977

Eurysquillidae Manning, 1977

Coronidopsis serenei (Moosa, 1973)

Coronidopsis serenei Moosa, 1973: 2, 5, fig.1 [type locality: off Elat Bay, Tjut Island, Kai Islands, Indonesia, 5°40'S, 132°59'S, 70m].—Manning and Garcia, 1982: 595, figs. 1e, f, 2, 3.

Material examined

PMBC 16039, 1 female, TL 28 mm, off Phuket, BIOSHELF St. G2, 08°00'N, 098°10'E, SM, 63 m, muddy-sand, coll. S. Bussarawit and C. Aungtonya, 23.04.1996.

Measurements

Female ($n = 1$) TL 28 mm.

Remarks

The specimen agrees well with the accounts of Moosa (1973) and Manning and Garcia (1982). As with specimens of *Coronidopsis* reported by Manning and Garcia (1982), the present specimen was taken on muddy-sand.

Distribution

Northern South China Sea, Indonesia, the Philippines and now the Andaman Sea.

Manningia australiensis Manning, 1970

Manningia australiensis Manning, 1970: 78, fig. 1 [type locality: off Gillett Cay, Swain Reefs, Australia, 21°40'S, 152°15'E].

Manningia thorsoni Naiyanetr 1987: 239, figs. 2, 3; 1998: 122 [type locality: Airport Beach, Phuket].

Manningia vinogradovi Makarov, 1978: 183, fig. 4 [type locality: Gulf of Tonkin, Vietnam, 20°11.5'N, 113°02'E].

Material examined

NNM S1042, 1 male, TL 20 mm, Airport Beach, Phuket, 20 m, grab, coll. J. Hylleberg, 15.12.1980 (holotype of *Manningia thorsoni* Naiyanetr).

Measurements

Male ($n = 1$) TL 20 mm.

Remarks

Previously reported from Phuket by Naiyanetr (1987; 1998) as *M. thorsoni*. The holotype and paratype of *M. thorsoni* were both collected by grab at depths between 18 and 20 m. The paratype was collected from a substrate of 'clay, coarse sand to gravel' (Naiyanetr, 1998).

Distribution

New Caledonia, Australia, Vietnam, and Phuket, Thailand.

Gonodactyloidea Giesbrecht, 1910

Gonodactylidae Giesbrecht, 1910

Gonodactylaceus falcatus (Forskål, 1775)

Cancer falcatus Forskål, 1775: 96 [type locality: Red Sea].

Gonodactylus chiragra var. *mutatus* Lanchester, 1903: 450 [type locality: Furnadu Velu, Miladummadulu Atoll, Maldive Islands, 6°00'N, 73°10'E].

Gonodactylus glaber var. *rotundus* Borradaile, 1907: 211–212, pl. 22: fig. 2 [type locality: Coetivy, Seychelle Islands, 7°08'S, 56°16'E, and Zanzibar, 6°10'S, 39°12'E].

Gonodactylus mutatus.—Dingle *et al.*, 1977: 14–15, fig. 8c, d.—Manning, 1978a: 7–9, figs. 4, 5, 11.—Naiyanetr, 1980: 44, 1998: 122.

Remarks

Dingle *et al.* (1977), Manning (1978a) and Naiyanetr (1998) reported *G. falcatus* (as *G. mutatus*) from Phuket. Dingle *et al.* (1977) reported the species from coral rubble habitats.

Distribution

Western Indian Ocean to Phuket, the Gulf of Thailand, Vietnam and the central Pacific.

Gonodactylaceus ternatensis (de Man, 1902)

Gonodactylus glabrous var. *ternatensis* de Man, 1902: 914 [part, type locality: Ternate, Indonesia, 0°48'N, 127°20'E].

Gonodactylus ternatensis.—Dingle *et al.*, 1977: 14–15, fig. 8a, b.—Manning, 1978a: 10–12, figs. 7, 8, 13.—Naiyanetr, 1980: 44.

Gonodactylaceus ternatensis.—Naiyanetr, 1998: 122.

Remarks

Dingle *et al.* (1977) and Manning (1978a) reported *G. ternatensis* from live coral habitats at Phuket.

Distribution

Japan, Samoa, New Caledonia, the Philippines, and Vietnam to Phuket, Thailand.

Gonodactylellus affinis (de Man, 1902)

Gonodactylus chiragra var. *affinis* de Man, 1902: 912 [type locality: Ternate, Indonesia, 0°48'N, 127°20'E].

Gonodactylus chiragra var. *confinis* de Man, 1902: 912, pl. 27, fig. 66 [type locality: Ternate, Indonesia, 0°48'N, 127°20'E].

Gonodactylus chiragra var. *segregatus* a Lanchester, 1903: 448, pl. 23, fig. 6 [type localities: Goidu, Goifurfehendu Atoll, Maldives; Hulule, Male Atoll, Maldives; South Nilandu Atoll, Maldives; Minikoi, Laccadive Islands; Macclesfield Bank, South China Sea].

Gonodactylus chiragra var. *segregatus* b Lanchester, 1903: 448, pl. 23, fig. 7 [type

localities: North Male Atoll and South Nilandu Atoll, Maldives].

Gonodactylus affinis.—Dingle *et al.*, 1977: 15, 16, fig. 9d.—Manning, 1978c: 2–4, fig. 1.—Naiyanetr, 1980: 44.

Gonodactylellus affinis.—Naiyanetr, 1998: 122.

Material examined

PMBC 16040, 1 male, TL 26 mm, off Phuket, BIOSHELF St. E3, 08°32'N, 097°46'E, TD, 79 m, sand with shell fragments, coll. S. Bussarawit and C. Aungtonya, 22.04.1996; PMBC 16041, 1 male, TL 26 mm, off Phuket, BIOSHELF St. H1, 07°44'N, 098°17'E, TD, 32 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16042, 3 males, TL 11–19 mm, 4 females, TL 9–19 mm, 1 male postlarva, TL 8 mm, 2 female postlarvae, TL 7–8 mm, Racha Noi Island, 20 m, coral rubble, coll. K. Larsen, 14.12.1998; PMBC 16043, 2 males, TL 12–26 mm, off Phuket, BIOSHELF St. E4, 08°30'N, 097°33'E, TD, 74 m, coll. S. Bussarawit and C. Aungtonya, 21.04.1996; AM P60571, 2 males, TL 22–26 mm, off Phuket, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996.

Measurements

Males ($n = 9$) TL 11–26 mm, female ($n = 4$) TL 9–26 mm, male postlarva ($n = 1$) TL 8 mm, female postlarvae ($n = 2$) TL 7–8 mm.

Remarks

Previously reported from Phuket by Dingle *et al.* (1977), and Naiyanetr (1998). Specimens were collected from sand, shell and coral rubble habitats at depths between 20 and 79 m.

Distribution

Western Pacific Ocean to the Philippines, the South China Sea, Vietnam and Thailand (Manning, 1995).

Gonodactylellus annularis Erdmann and Manning, 1998

Gonodactylellus annularis Erdmann and Manning, 1998: 617–618, fig. 1b [type locality: Kapoposang, Spermonde, Indonesia].

Material examined

PMBC 16044, 3 males, TL 9–12 mm, 2 females, TL 8 mm, Racha Noi Island, 20 m, coral rubble, coll. K. Larsen, 14.12.1998; AM P60570, 1 male, TL 13 mm, Racha Noi Island, 20 m, coral rubble, coll. K. Larsen, 14.12.1998

Measurements

Males ($n = 4$) TL 9–13 mm, female ($n = 2$) TL 8 mm.

Remarks

The specimens agree well with the type description (Erdmann and Manning 1998) and represent the first record of the species from the Indian Ocean. As with type series of *G. annularis*, the present specimens were collected from coral rubble.

Distribution

Indonesia and now the Andaman Sea.

***Gonodactylinus viridis* (Serène, 1954)**

Gonodactylus chiragra var. *viridis* Serène, 1954: 6, 7, 10, 74–76, 87, fig. 13–3 [type locality: Cauda Bay, Vietnam].

Gonodactylus viridis.– Dingle *et al.*, 1977: 16–17, fig. 9a–c.– Manning, 1978c: 4, fig. 2a–c.– Naiyanetr, 1980: 44.

Gonodactylinus viridis.– Naiyanetr, 1998: 123.

Material examined

CUMZ (unregistered), 3 males, TL 32–42 mm, Naiyang Beach, Phuket, coll. P. Naiyanetr, 21.04.1966; USNM (unregistered), 3 males, TL 22–41 mm, 2 females, TL 33–42 mm, Phuket, 0–1.5 m, in shale and coral, coll. R. Caldwell, Aug 1973.

Measurements

Males ($n = 3$) TL 32–42 mm.

Remarks

Dingle *et al.* (1977) and Manning (1978c) reported *G. viridis* from Phuket. *Gonodactylinus viridis* is common amongst rubble on coral and

rocky reef flats.

Distribution

Japan, New Caledonia, the Philippines, and Vietnam to Phuket, Thailand.

***Gonodactylus chiragra* (Fabricius, 1781)**

Squilla chiragra Fabricius, 1781: 515 [type locality: restricted to Ambon, Indonesia, 3°43'S, 128°12'E, by neotype selection (Manning, 1981a: 217)].

Gonodactylus chiragra.– de Man, 1888b: 299 [part].– Kemp, 1913: 4, 11, 147, 155, fig. 2, pl. 9, fig. 107 [part].– Dingle *et al.*, 1977: 17, fig. 10b, c, e.– Naiyanetr, 1980: 43; 1998: 123.

Material examined

CUMZ (unregistered), 2 males, TL 55–63 mm, 1 female, TL 89 mm, Phuket Province, 23.04.1968; CUMZ (unregistered), 3 males, TL 78–81 mm, 1 female, TL 66 mm, Saku Bay, Phuket Province, coral, coll. P. Naiyanetr, 28.04.1968; CUMZ (unregistered), 1 male, TL 69 mm, 1 female, TL 62 mm, Hnai Island, Satun Province, coll. Dumri and Watanachai, 16.01.1966; ZRC 1999.2079, 1 male, TL 88 mm, 2 females, TL 14–82 mm, Phuket, coral reef, coll. P. Ng, Dec 1998; USNM 150798, 4 males, TL 20–81 mm, 3 females, TL 14–75 mm, Phuket, 0–1.5 m, in coral and shale, coll. R. Caldwell, Aug 1973.

Measurements

Males ($n = 11$) TL 20–88 mm, female ($n = 8$) TL 14–89 mm.

Remarks

The present specimens of *G. chiragra* were collected on reef flats from cavities in reef rock and amongst coral rubble, especially in the upper intertidal zone. The species was reported from Phuket by Dingle *et al.* (1977).

Distribution

French Polynesia to Japan, Australia, and Indo-Malayan region to the western Indian Ocean.

Gonodactylus platysoma (Wood-Mason, 1895)

Gonodactylus platysoma Wood-Mason, 1895: 11, pl. 3, figs. 3–9 [type locality: restricted to Society Islands, 17°00'S, 150°00'W, by lectotype selection (Ghosh and Manning, 1988: 654)].

Gonodactylus chiragra var. *tumidus* Lanchester, 1903: 447, 456, pl. 23: fig. 1 [type locality: Minikoi, Laccadive Islands (= Lakshadweep), 8°17'S, 73°02'E].

Gonodactylus chiragra var. *acutus* Lanchester, 1903: 447, 456, pl. 23: fig. 3 [type locality: Minikoi, Laccadive Islands (= Lakshadweep), 8°17'S, 73°02'E].

Gonodactylus chiragra var. *platysoma*.– Kemp, 1913: 4, 11, 147, 162, fig. 1.– Ghosh and Manning, 1988: 654.

Gonodactylus platysoma.– Dingle *et al.*, 1977: 17, fig. 10a, d.– Naiyanetr, 1980: 43; 1998: 123.

Remarks

Dingle *et al.* (1977) reported *G. platysoma* from Phuket amongst live intertidal coral.

Distribution

French Polynesia to Okinawa and Australia to the western Indian Ocean.

Gonodactylus smithii Pocock, 1893

Gonodactylus Smithii Pocock, 1893: 475, pl. 20B [type locality: Arafura Sea].

Gonodactylus chiragra var. *anancyrus* Borradaile, 1900: 395, 397, 401 [type localities: Talili Bay (4°12'S, 152°08'E), New Britain and Lifu (20°53'S, 167°13'E), Loyalty Islands].

Gonodactylus smithii.– Dingle *et al.*, 1977: 19, fig. 11.– Naiyanetr, 1980: 43.

Gonodactylus minikoiensis Ghosh, 1990: 201, 202, fig. 1 [type locality: Minikoi, 8°17'S, Lakshadweep, 73°02'E].

Gonodactylus arabica Ghosh, 1990: 201, 205, figs. 2, 3e [type locality: Kavaratti, Lakshadweep, 10°33'N, 72°38'E].

Material examined

CUMZ (unregistered), 1 female, TL 60 mm, Sak Island, Andaman Sea, from coral, coll. Surapol Sudara, 15.02.1963.

Measurements

Female ($n = 1$) TL 60 mm.

Remarks

Gonodactylus smithii commonly occurs intertidally amongst live corals and rubble, and was reported from Phuket by Dingle *et al.* (1977).

Distribution

Western Indian Ocean to Vietnam, Australia, New Caledonia and Okinawa (Manning, 1995).

Odontodactylidae Manning, 1980***Odontodactylus japonicus*** (de Haan, 1844)

Gonodactylus japonicus de Haan, 1844, pl. 51: fig. 7 [type locality: Japan]; 1849: 255 [text].– Miers, 1880: 116.

Gonodactylus Edwardsii Berthold, 1845: 48.

Odontodactylus japonicus.– Manning, 1965: 260; 1967: 7–10, fig. 2.

Material examined

PMBC 16045, 1 male, TL 90 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43'–44'N, 098°36'–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; PMBC 16046, 1 male, TL 148 mm, 1 female, broken, CL 27.75 mm, Phuket, fishing port, 40–80 m, coll. P. Ng and P. Davie, Dec 1998; QM25564, 1 male, TL 135 mm, Phuket, fishing port, 40–80 m, coll. P. Ng and P. Davie, Dec 1998; ZRC 2001.1116, 1 female, TL 124 mm, Phuket fishing port, Andaman Sea, coll. S. Chaitiamvong *et al.*, Dec 1998; AM P58289, 1 male, TL 117 mm, Andaman Sea off Pichai, Phuket, fishing port, trawled, coll. P. Ng, Dec 1999.

Measurements

Male ($n = 4$) TL 90–148 mm, female ($n = 1$) TL 124 mm.

Remarks

The precise habitat of *O. japonicus* from Phuket is not known, but all specimens were trawled on soft, sandy-mud substrates at depths of 30–40 m.

Distribution

Japan, Australia, the Western Indian Ocean and now from Phuket, Thailand.

Odontodactylus scyllarus (Linnaeus, 1758)

Cancer Scyllarus Linnaeus, 1758: 633 [type locality: Indonesia].

Gonodactylus Bleekeri A. Milne Edwards, 1868: 65, footnote [type locality: Batavia, Indonesia (= Jakarta, 6°10'S, 106°48'E)].

Gonodactylus elegans Miers, 1884: 566, 575, pl. 52: fig. b [type localities: Providence Island (9°14'S, 51°02'E) and Providence Reef (9°23'S, 51°03'E), Seychelles].

Odontodactylus scyllarus.—Manning, 1967: 10–15, fig. 3.—Dingle *et al.*, 1977: 12–13, fig. 6c–e. —Naiyanetr, 1980: 44; 1998: 123.

Remarks

Previously reported from Phuket by Dingle *et al.* (1977).

Distribution

Western Indian Ocean to the central Pacific.

Raoulius cultrifer (White, 1851)

Gonodactylus cultrifer White, 1851: 96, pl. 16: figs. 1, 2 [type locality: China].

Gonodactylus carinifer Pocock, 1893: 478, pl. 20B, fig. 4 [type locality: Holothuria Bank, 13°25'S, 126°00'E].

Odontodactylus cultrifer.—Manning, 1967: 18–22, fig. 5.

Odontodactylus mindanaoensis Roxas and Estampador, 1930: 94, 115, pl. 4: figs. 1–3 [type locality: Cotabato, Mindanao, Philippines, 7°13'S, 124°15'E].

Odontodactylus cultrifer var. *tridentata* Serène, 1954: 6, 7, 8, 72, pl. 6: figs. 7, 8 [type locality: Nhatrang Bay, Vietnam].

Material examined

PMBC 19047, 1 male, TL 100 mm, Phuket, fishing port, 40–80 m, coll. S. Chaitiamvong *et al.*, 08.12.1998; ZRC 2001.1118, 1 male, TL 79 mm, Pichai fishing port, Phuket, coll. P. Ng, Apr 1999; ZRC 2001.1117, 1 male, TL 105 mm, Pichai fishing port, Phuket, coll. S. Chaitiamvong *et al.*, Dec 1998; ZRC 1999.2088, 2 males, TL 98 mm; 1 broken, CL 21 mm, Andaman Sea, Thailand, coll. P. Ng, 24.09.1999; AM P58290, 3 males, TL 90–104 mm, Andaman Sea off Pichai, Phuket, fishing port, trawled, coll. S. and R. Ah Yong, 24.12.1999.

Measurements

Males ($n = 8$) TL 79–105 mm.

Remarks

Like *O. japonicus*, *R. cultrifer* was trawled on soft, sandy-mud substrates.

Distribution

Reported from Japan, to Australia and Vietnam (Manning, 1995), the Gulf of Thailand (Naiyanetr, 1980; 1998), southern Malacca Strait (Kemp and Chopra, 1921), and now from Phuket.

Protosquillidae Manning, 1980***Haptosquilla glyptocercus*** (Wood-Mason, 1875)

Gonodactylus glyptocercus Wood-Mason, 1875: 232 [type locality: Nicobar Islands, 8°00'N, 93°30'E].—Kemp, 1913: 186–187: 11.—Kemp and Chopra, 1921: 311.—Tiwari and Biswas, 1952: 362.

Protosquilla cerebralis Brooks, 1886b: 22, 72, pl. 14: figs. 2, 3, pl. 16: figs. 2, 3 [type locality: Levuka, Fiji, 17° 42'S, 178°50'E].

Haptosquilla glyptocercus.—Manning, 1969c: 161.—Dingle *et al.*, 1977: 13, fig. 7.—Naiyanetr, 1980: 44; 1998: 123.

Material examined

AM P58293, 1 female, TL 25 mm, Kalim Beach, Patong, Phuket, coral reef, from hole in reef rock, low tide, coll. S. and R. Ah Yong, 26.12.1999.

Measurements

Female ($n = 1$) TL 25 mm.

Remarks

Previously reported from Phuket by Dingle *et al.* (1977). The present specimen was collected from a cavity in intertidal reef rock.

Distribution

Andaman Sea to Japan, Vietnam, the Philippines, New Caledonia, the Marshall Islands, Fiji and Australia.

Haptosquilla tuberosa (Pocock, 1893)

Gonodactylus tuberosus Pocock, 1893: 476, pl. 20B, fig. 2 [type locality: Macclesfield Bank, South China Sea].

Gonodactylus nefandus Kemp, 1911: 93 [type localities: Andaman Islands, Cheduba, and Malacca Straits]; 1913: 179–180, pl. 10: figs. 119, 120.– Kemp and Chopra, 1921: 311.– Chopra, 1934: 41–42.– Ghosh and Manning, 1988: 654.

Haptosquilla nefanda.– Manning, 1969c: 162.

Material examined

PMBC 16048, 1 female, TL 22 mm, off Phuket, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996.

Measurements

Female ($n = 1$) TL 22 mm.

Distribution

Philippines, Indonesia, Burma, Nicobar Islands, Andaman Sea and now from Phuket.

Siamosquilla hyllebergi Naiyanetr, 1989

Siamosquilla hyllebergi Naiyanetr, 1989: fig. 1 [type locality: Similan Island, Andaman Sea, Phangnga Province, Thailand]; 1998: 123.

Material examined

Paratypes: ZRC 1999.0932, male, TL 16 mm, Similan Island, Thailand, 5 m, associated with corals, 14.02.1982; NNM S1098, male, TL 17 mm, Similan Island, Thailand, 5 m, associated with corals, 15.02.1981.

Remarks

Siamosquilla hyllebergi occupies pre-formed cavities amongst live corals.

Measurements

Males ($n = 2$) TL 16–17 mm.

Distribution

Known only from the eastern Andaman Sea, Thailand.

Pseudosquillidae Manning, 1977*Pseudosquilla* Dana, 1852*Pseudosquilla ciliata* (Fabricius, 1787)

Squilla ciliata Fabricius, 1787: 333 [type locality: Indian Ocean].

Squilla stylifera Lamarck, 1818: 189 [type locality: unknown].

Squilla quadrispinosa Eydoux and Souleyet, 1842: 362, pl. 5: fig 1 [type locality: Sandwich Islands (= Hawaii), 24°00'N, 167°00'E].

Pseudosquilla ciliata var. *occidentalis* Borradaile, 1900: 398, 402 [type locality: West Indies].

Pseudosquilla ciliata.– Kemp, 1913: 10, 96–100.– Chopra, 1934: 39.– Dingle *et al.*, 1977: 12, fig. 6a, b.– Naiyanetr, 1980: 44; 1998: 124.

Material examined

CUMZ (unregistered), 2 females, TL 70–71 mm, Phuket Province, coral, coll. S. Sudara, 10.03.1963.

Measurements

Female ($n = 2$) TL 70–71 mm.

Remarks

Pseudosquilla ciliata was reported from Phuket by Dingle *et al.* (1977) and Naiyanetr (1998). The species is common amongst rubble and seagrass on intertidal reef flats.

Distribution

All tropical oceans except the Eastern Pacific.

Lysiosquilloidea Giesbrecht, 1910

Lysiosquillidae Giesbrecht, 1910

Lysiosquilla tredecimdentata Holthuis, 1941

Lysiosquilla maculata.– Kemp, 1913: 115, pl. VIII: figs. 86–91 [part, not *Lysiosquilla maculata* (Fabricius, 1793)].

Lysiosquilla maculata var. *tredecimdentata* Holthuis, 1941: 273–274, fig. 6 [type locality: Hedjaff, near Aden].

Lysiosquilla tredecimdentata.– Dingle *et al.*, 1977: 8, fig. 4c–e, h.– Manning, 1978b: 3, 13, 15, fig. 13; 1995: 132–133, pl. 24, figs. 68b, 69c, f.– Naiyanetr, 1980: 42; 1998: 124.

Material examined

ZRC 2001.1119, 1 female, TL 154 mm, Pichai fishing port, Phuket, coll. P. Ng, Apr 1999.

Measurements

Female ($n = 1$) TL 154 mm.

Remarks

The single specimen agrees well with published accounts (Holthuis, 1941; Manning, 1978b; 1995). The dactyli of the raptorial claws each bear ten teeth and a low tubercle is present on the uropodal protopod adjacent to the endopod articulation. The present specimen was trawled on sandy-mud but Dingle *et al.* (1977) also reported the species from deep burrows on intertidal reef flats.

Distribution

Western Indian Ocean to India, Thailand, and Vietnam (Manning, 1995).

Nannosquillidae Manning, 1980

Acanthosquilla phalangium (Fabricius, 1798)

Squilla phalangium Fabricius, 1798: 416 [type locality: Bombay India, by neotype selection (Holthuis, 2000)].– Holthuis, 2000: 14–16, figs. 1, 2.

Coronis acanthocarpus Claus, 1871: 129 [type locality: Port Essington, Northern Territory, Australia, 11°10'S, 132°08'E].

Lysiosquilla acanthocarpus Miers, 1880: 3, 11, pl. 1: figs. 7–9 [type locality: Port Essington, Northern Territory, Australia, 11°10'S, 132°08'E].– Kemp, 1913: 4, 11, 120–122.

Acanthosquilla sarasinorum Müller, 1886: 471, 478, pl. 4: fig. 3 [type locality: Trincomali, Ceylon, 8°34'N, 81°14'E].

Acanthosquilla phalangium.– Holthuis, 2000: 16, figs. 1, 2.

Material examined

CUMZ (unregistered), 1 male, TL 36 mm, Naiyang Beach, Phuket, 21.04.1966.

Measurements

Male ($n = 1$) TL 36 mm.

Remarks

The single specimen bears seven teeth on the dactylus of both raptorial claws, although the usual number is five or six (Kemp, 1913). *Acanthosquilla phalangium* is common on intertidal sandflats where it constructs deep, U-shaped burrows. Dingle *et al.* (1977) speculated that *A. phalangium* (as *A. acanthocarpus*) may occur in Phuket, and the present record confirms their suspicion.

Distribution

Western Indian Ocean to the western Pacific including northern Australia. A new record for Phuket.

Acanthosquilla multifasciata (Wood-Mason, 1895)

Lysiosquilla multifasciata Wood-Mason, 1895: 11–12, figs. 22–24 [type locality: Bombay, India].
Acanthosquilla multifasciata.– Dingle *et al.*, 1977: 6, 8, fig. 4a, b.– Naiyanetr, 1980: 42; 1998: 124.

Remarks

Dingle *et al.* (1977) reported *A. multifasciata* from Phuket burrowing in intertidal mudflats in the outflows from mangrove streams.

Distribution

Western Indian Ocean to Australia and the western Pacific.

Acanthosquilla tigrina (Nobili, 1903)

Lysiosquilla tigrina Nobili, 1903: 28 [type locality: Santubong, Borneo].– Naiyanetr, 1980: 42.

Material examined

CUMZ (unregistered), 1 male, TL 30 mm, 1 female, TL 43 mm, Naiyang Beach, Phuket, 21.04.1966; ZRC 1999.2346, 1 male, TL 42 mm, Naiyang Beach, Phuket, 21.04.1966.

Measurements

Male ($n = 2$) TL 30–42 mm, female ($n = 1$) TL 43 mm.

Remarks

The specimens agree well with Kemp's (1913) account and figures of the holotype of *A. tigrina*. The number of posterior spines on the sternum varies from 7–10, and the number of teeth on the dactylus of the raptorial claws varies from 9–12. Like *A. phalangium*, *A. tigrina* was collected from intertidal sand flats.

Distribution

Borneo, the Gulf of Thailand and now from Phuket, Thailand.

Parasquilloidea Manning, 1995**Parasquillidae** Manning, 1995***Faughnia formosae*** Manning and Chan 1997

Faughnia formosae Manning and Chan, 1997: 546–551, figs. 1–4 [type locality: Taiwan].

Material examined

PMBC 16049, 1 female, TL 54 mm, Phuket, fishing port, 40–80 m, trawled, sandy-mud, coll. S. Chaitiamvong *et al.*, 08.12.1998.

Measurements

Female ($n = 1$) TL 54 mm.

Remarks

The specimen agrees well with the type material in the USNM and differs only in having the telson carinae slightly more slender than in the holotype, a feature related to size. The presence of *F. formosa* in the Andaman Sea, previously known only from Japan and Taiwan, represents a significant range extension for the species.

Distribution

Japan, Taiwan, and for the first time from Phuket, Thailand.

Squilloidea Latreille, 1802**Squillidae** Latreille, 1802***Anchisquilla fasciata*** (de Haan, 1844)

Squilla fasciata de Haan, 1844 (atlas): pl. 51, fig. 4 [type locality: Japan]; 1849 (text): 224.– Kemp, 1913: 3, 10, 20, 34–36, pl.1, figs. 21–23.– Naiyanetr, 1980: 42; 1998: 126.

Material examined

PMBC 16050, 1 male, TL 76–81 mm, Phuket, fishing port, trawled, sandy-mud, coll. P. Davie and P. Ng, Dec 1998.

Measurements

Male ($n = 2$) TL 76–81 mm.

Distribution

Western Indian Ocean to Australia, Japan and New Caledonia. A new record for Phuket.

Carinosquilla multicarinata (White, 1849)

Squilla multicarinata White, 1849: 144, pl. 6, fig. 1 [type localities: Nagasaki Bay, Japan, and the Philippines].–Naiyanetr, 1980: 43.

Material examined

PMBC 16051, 2 males, TL 64–70 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43′–44′N, 098°36′–40′E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; PMBC 16052, 2 females, TL 71–80 mm, BIOSHELF St. H3, 07° 45′N, 097° 58′E, TD, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16053, 2 males, TL 64–66 mm, 2 females, TL 69–84 mm, Phuket, fishing port, trawled, 40–80 m, coll. P. Ng and P. Davie, 08.12.1998; QM W25565, 1 male, TL 74 mm, 1 female, TL 65 mm, Phuket, fishing port, trawled, 40–80 m, coll. P. Ng and P. Davie, 08.12.1998; ZRC 2001.1121, 1 male, TL 76 mm, Pichai fishing port, Phuket, coll. P. Ng, Apr 1999; ZRC 2001.1120, 2 males, TL 54–80 mm, 4 females, TL 75–85 mm, Phuket fishing pier, Andaman Sea, Thailand, coll. S. Chaitiamvong *et al.*, Dec 1998; ZRC 1999.2069, 1 female, TL 69 mm, Andaman Sea, Thailand, coll. P. Ng, 24.09.1999; AM P58285, 1 male, TL 72 mm, 2 females, TL 67–76 mm, Andaman Sea off Pichai, Phuket, fishing port, trawled, coll. S. and R. Ah Yong, 24.11.1999.

Measurements

Male ($n = 9$) TL 54–80 mm, female ($n = 12$) TL 67–101 mm.

Distribution

Japan to southern India, the Philippines, Thailand and Burma. Reported for the first time from Phuket.

Carinosquilla spinosa sp. nov.

(Fig. 1)

Squilla carinata.– Ingle, 1963: 17–18, figs. 6–8, 10–12, 67.– Manning, 1968: 21–23, fig. 6.

Squilla multicarinata.– Dollfus, 1938: 196, fig. 7 [not *Squilla multicarinata* White, 1849].

Carinosquilla carinata.– Tirmizi and Manning, 1968: 4.– Moosa and Cleva, 1984: [not *C. carinata* (Serène, 1950)].

Material examined

Holotype: PMBC 16054, male, TL 94 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43′–44′N, 098°36′–40′E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998.

Paratypes: All paratypes Andaman Sea, Phuket, Thailand. PMBC 16055, 2 males, TL 68–82 mm, 6 females, TL 57–84 mm, BIOSHELF St. PB7–6, 07°43′–44′N, 098°36′–40′E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; ZRC 2001.1122, 1 female, TL 102 mm, BIOSHELF St. PB7–6, 07°43′–44′N, 098°36′–40′E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; AM P58294, 1 male, TL 86 mm, BIOSHELF St. PB7–6, 07°43′–44′N, 098°36′–40′E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; AM P58286, 1 male, broken; CL 20.4 mm, 1 female, TL 95 mm, Pichai fishing port, trawled, 30–40 m, coll. S. and R. Ah Yong, 24.11.1999; AM P58287, 1 male, TL 82 mm, Pichai fishing port, trawled, 30–40 m, coll. P. Ng, Dec 1999; ZRC 2001.1123, 1 male, TL 94 mm, Pichai fishing port, coll. P. Ng, Apr 1999; ZRC 2001.1124, 1 male, TL 111 mm, Pichai fishing port, coll. S. Chaitiamvong *et al.*, Dec 1998.

Diagnosis

Eyestalk with short, irregular carinae. Ocular scales with bifurcate apices. Rostral plate with long, distinct, MD carina and LT carinae, and several short intervening carinae or elongate tubercles. Carapace with anterior bifurcation of MD carina opening anterior to dorsal pit. Mandibular palp 3-segmented. Raptorial claw dactylus with 6 teeth; merus outer face with longitudinal carina or irregular vermiform sculpture. TS5 dorsal carinae longitudinal or reticulate. TS6–8 and AS1–4 each

with posterior margin between SM carinae armed with 3 or more spines; carinae of normal complement armed posteriorly as follows: SM 1–6, IM 1–6, LT 1–6, MG 1–5. Telson dorsolateral

surface numerous supplementary longitudinal carinae, interrupted proximally. Uropodal protopod inner margin with serrations or short spines.

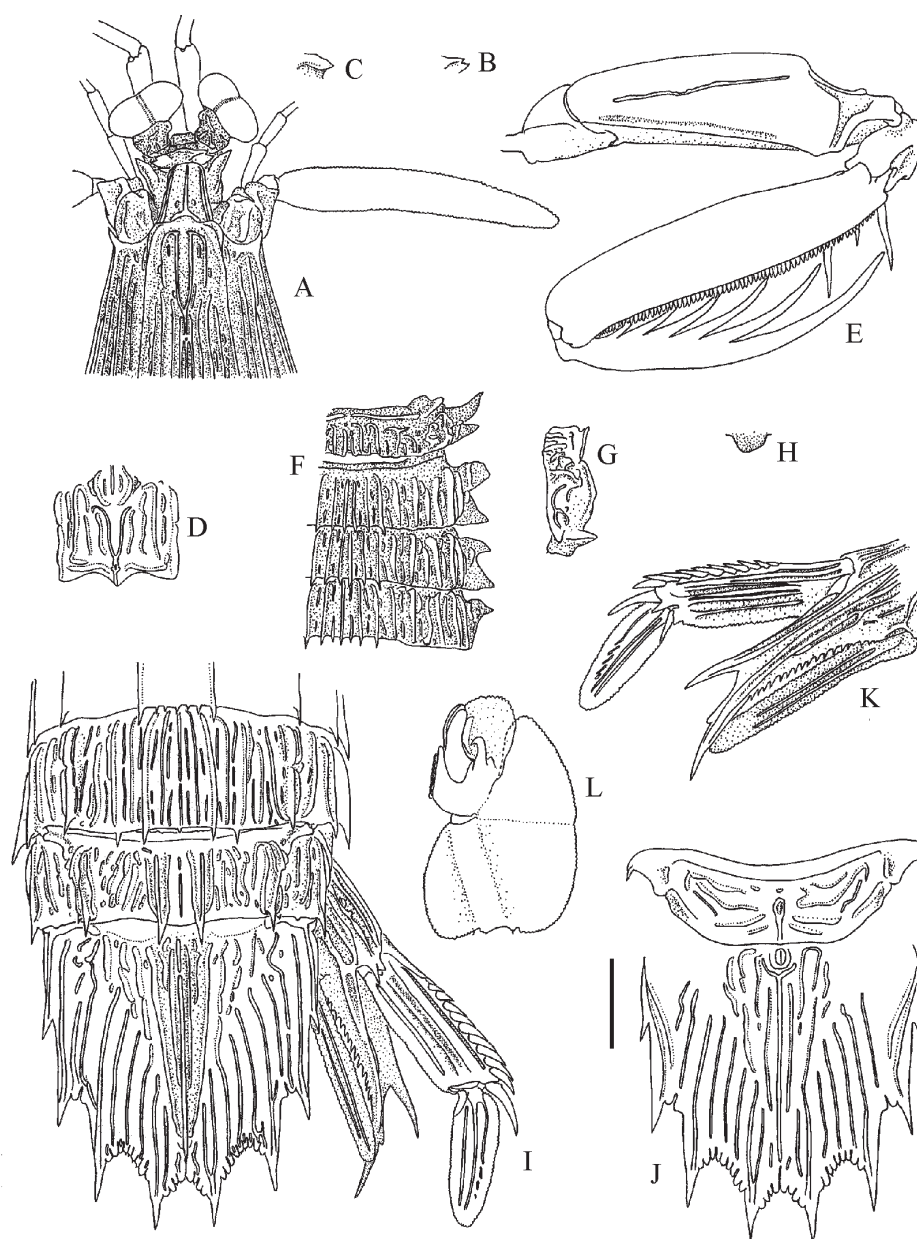


Figure 1 *Carinosquilla spinosa* sp. nov. Holotype male TL 94 mm (PMBC16054). A, anterior cephalon, dorsal; B, ocular scale, right dorsal; C, A1 somite dorsal process, right lateral; D, carapace, posteromedian; E, raptorial claw, right lateral; F, TS5–8, right dorsal; G, TS5, right lateral; H, TS8 sternal keel, right lateral; I, AS4–6, telson and uropod, dorsal; J, AS6 and telson, ventral; K, uropod, right ventral; L, PLP 1 endopod, right anterior. Scale: A–K = 5 mm, L = 2.5 mm.

Description

Eyestalk with short, irregular carinae; CI 418–477. Ocular scales bifurcate.

A1 peduncle 1.01–1.15CL. A1 somite dorsal processes with acute apices, directed anterolaterally. A2 scale length 0.70–0.83CL.

Rostral plate with length and breadth subequal, but appearing elongate; margins convergent; apex rounded to subtruncate; with long, distinct, MD carina and lateral carinae, and short, elongate tubercle lateral to MD carina.

Carapace anterior width 0.39–0.43CL; anterior bifurcation of MD carina opening anterior to dorsal pit.

Raptorial claw dactylus with 6 teeth; merus with longitudinal carina or irregular sculpture on outer face.

Mandibular palp 3-segmented. MXP1–4 each with epipod.

TS6 lateral process with anterior lobe broad, quadrate, apex truncate; posterior lobe broad, triangular; anterior margin straight to sinuous; apex blunt. TS7 lateral process anterior lobe triangular, apex blunt; posterior lobe broad, triangular, anterior margin straight to sinuous; apex blunt. TS8 anterolateral margin triangular, apex blunt; sternal keel rounded.

TS5 dorsal carinae longitudinal or reticulate. TS6–8 and AS1–4 each with 3 or more spines on posterior margin between SM carinae. AS5 with up to 3 posterior spines between SM carinae; with spine adjacent to SM spine; carinae of normal complement armed posteriorly as follows: SM 1–6, IM 1–6, LT 1–6, MG 1–5. AS6 SM carinae tricarinate; laterally and medially with short, irregular carinae and tubercles; sternum with continuous transverse proximal carina, short median and numerous, irregular transverse carinae and tubercles lateral to MD carina; with ventrolateral spine anterior to uropodal articulation.

Telson with length and breadth subequal; prelateral lobe longer than margin of LT tooth, with spiniform apex; dorsolateral surface numerous supplementary longitudinal carinae, interrupted proximally; denticles SM 3–5, IM 7–10, LT 2.

Uropodal protopod outer margin smooth; inner margin with 12–19 serrations or short spines; with minute ventral tubercle anterior to endopod articulation; protopod terminal spines with lobe on

outer margin of inner spine rounded, narrower than adjacent spine, proximal margin concave. Exopod proximal segment outer margin with 10–12 movable spines, distalmost not exceeding midlength of distal segment; distal margin 2 ventral spines, outer longest. Exopod distal segment black entirely or on proximal 3/4; length subequal to or shorter than proximal segment; dorsally and ventrally carinate. Endopod dorsally and ventrally carinate.

Colour in life

Overall pale grey-brown with dark brown grooves on carapace and posterior margin of thoracic and abdominal somites. Primary teeth of telson with red apices. Terminal spines of uropodal protopod and outer spines of uropodal exopod red. Distal portion of proximal segment of uropodal exopod and central proximal third of distal segment black. Uropodal endopod apex black.

Measurements

Male ($n = 8$) TL 68–111 mm, female ($n = 7$) TL 57–102 mm. Other measurements of holotype: CL 20.8 mm, anterior carapace width 8.4 mm, CW 4.5 mm, A1 peduncle 21.7 mm, A2 scale 16.3 mm.

Remarks

Carinosquilla spinosa sp. nov. closely resembles *C. carinata*, in the carinate eyestalks, colouration and general habitus, but differs in the spination of the thoracic and abdominal somites. In *C. carinata*, the posterior margin between the submedian carinae of AS1–5 is smooth or crenulate, or rarely has 1 or 2 small spinules on AS4–5 based on examination of type material (USNM) and specimens in other collections (ZRC, CUMZ). In *C. spinosa*, however, the posterior margins between the submedian carinae of TS6–8 and AS1–4 are lined with spines, as well as often having 1 or 2 spines lateral to the spines of each submedian carina of the abdomen. The type series of *C. spinosa* shows little variation except in typically size-related, meristic and morphometric features such as the relative size of the eyes (decreasing with increasing size) and number of spines on the inner margin of the uropodal protopod (increasing with increasing size).

Carinosquilla spinosa is presently known only from the Indian Ocean and all previous reports of *C. carinata* from the Indian Ocean are referable to the present new species. *Carinosquilla carinata* appears to be restricted to the South China Sea. Thus, the ranges of *C. carinata* and *C. spinosa* are apparently discrete, but conceivably could overlap in the Malacca Strait. Although Moosa (1991) reported *C. carinata* from New Caledonia (and in doing so synonymized *C. thailandensis* Naiyanetr, 1983, with the latter), his material is composite and referable to one or more additional undescribed species of *Carinosquilla* (Ahyong, in press). Moreover, *C. thailandensis* is itself a distinct species (Naiyanetr *et al.*, 2000). All specimens of *C. spinosa* were trawled on sandy-mud substrates at depths of 30–40 m.

Distribution

Indian Ocean, from Madagascar and the Red Sea to Phuket, Andaman Sea.

Clorida albolitura Ahyong and Naiyanetr, 2000

Clorida albolitura Ahyong and Naiyanetr, 2000: 317–320, fig. 2 [type locality: Ang Sila, Gulf of Thailand].

Material examined

PMBC 16056, 1 female, TL 28 mm, off Phuket, BIOSHELF St. B2, 09°15'N, 097°54'E, TD, 61 m, coll. S. Bussarawit and C. Aungtonya, 17.02.1998; PMBC 16057, 1 female, TL 13 mm, off Phuket, BIOSHELF St. K 20 m, 07°00'N, 099°24'E, BC, 21 m, coll. S. Bussarawit and C. Aungtonya, 06.05.1996; ZRC 1999.2194, 1 female, TL 45 mm, Phuket, Thai–Danish Expedition.

Measurements

Female ($n = 3$) TL 13–45 mm.

Remarks

The present species was previously reported as *C. latreillei* Eydoux and Souleyet, 1842 (*e.g.* Ingle, 1963; Manning, 1991; 1995), and is widely distributed in the Indo-West Pacific ranging from the Western Indian Ocean to Phuket, Vietnam, and several localities in the western Pacific.

Clorida gaillardii Moosa, 1986

Clorida gaillardii Moosa, 1986: 396–399, fig. 9 [type locality: Philippines].

Material examined

AM P57961, 1 male, TL 50 mm, Phuket, Thai–Danish Expedition; CUMZ (unregistered), 1 female, TL 62 mm, Phuket, Thai–Danish Expedition; ZRC 1999.2195, 1 male, TL 49 mm, Phuket, Thai–Danish Expedition.

Measurements

Males ($n = 2$) TL 40–50 mm, female ($n = 1$) TL 62 mm.

Remarks

The series of *C. gaillardii* agrees well the type material in the MNHN, differing only in showing more variation in the degree of spination on the abdominal carinae: SM 6, IM (2)3–6, LT (2)3–6, MG 2–6.

Distribution

New Caledonia, the Philippines and for the first time from Phuket.

Clorida rotundicauda (Miers, 1880)

Cloridella rotundicauda Miers, 1880: 3, 15, pl. 2: figs. 5, 6 [type locality: Formosa (= Taiwan)].
Squilla choprai Tweedie, 1935: 49, pl. 1 [type locality: Singapore].

Clorida rotundicauda.–Manning, 1979: 394–396, fig. 1.–Naiyanetr, 1980: 42; 1998: 126.

Material examined

USNM 173098, 1 male, TL 81 mm, Nam Bor Bay, Phuket, coll. D. Frith, 24.06.1977; USNM 173099, 1 male, TL 73 mm, Nam Bor Bay, Phuket, coll. D. Frith, 24.06.1977.

Measurements

Males ($n = 2$) TL 73–81 mm.

Remarks

These specimens were reported by Manning (1979). Both specimens were collected from

intertidal mudflat burrows in association with mangroves.

Distribution

China, Taiwan, Malaysia, Singapore and Phuket.

Cloridina chlorida (Brooks, 1886)

Squilla chlorida Brooks, 1886b: 21, 40, pl. 2, figs. 1–5 [type locality: Amboina, Indonesia, 3°43'S, 128°12'E, 27m].

Clorida chlorida.– Naiyanetr, 1980: 43.

Cloridina chlorida.– Naiyanetr, 1998: 126.

Material examined

PMBC 16058, 1 female, TL 55 mm, off Phuket, BIOSHELF St. I2, 07°30'N, 098°30'E, OS, 59 m, coll. S. Bussarawit and C. Aungtonya, 22.02.1998; PMBC 16059, 1 male, TL 19 mm, off Phuket, BIOSHELF St. J1, 07°15'N, 099°04'E, OS, 39 m, coll. S. Bussarawit and C. Aungtonya, 23.02.1998.

Measurements

Male ($n = 1$) TL 19 mm, female ($n = 1$) TL 55 mm.

Remarks

The specimens agree well with published accounts (Brooks, 1886; Manning, 1968). The postanal carina is present in the 55 mm specimen but absent in the 19 mm specimen.

Distribution

Western Indian Ocean to the Gulf of Thailand, Vietnam and New Caledonia. A new record for Phuket.

Cloridina ichneumon (Fabricius, 1798)

Squilla ichneumon Fabricius, 1798: 416 [type locality: Bombay India, by neotype selection (Holthuis, 2000)].– Holthuis, 2000: 16–17, fig. 3.

Squilla microphthalmalma H. Milne-Edwards, 1837: 523 [type locality: coast of India].

Clorida microphthalmalma.– Naiyanetr, 1980: 43.

Cloridina ichneumon.– Holthuis, 2000: 17, fig. 1.

Material examined

ZRC 2001.1125, 1 female, TL 43 mm, Phuket fishing pier, Andaman Sea, trawled, sandy-mud, coll. S. Chaitiamvong *et al.*, Dec 1998.

Measurements

Female ($n = 1$) TL 43 mm.

Remarks

The specimen agrees well with published accounts (*e.g.* Kemp, 1913; Tirmizi and Manning, 1968; Holthuis, 2000).

Distribution

Vietnam, New Caledonia to Gulf of Thailand and the Western Indian Ocean. A new record for Phuket.

Cloridina pelamidae (Blumstein, 1970)

Clorida pelamidae Blumstein, 1970: 220, figs. 2, 3 [type locality: Gulf of Tonkin, 20°20'N, 106°47'E].

Clorida thailandica Naiyanetr, 1980: 38, pl. 35 [type locality, Sichang Island, Chonburi Province, Thailand].

Material examined

PMBC 16060, 1 male, broken; CL 13.8 mm, off Phuket, BIOSHELF St. PB8, 07°44'N, 098°51'E, TD, 22 m, coll. S. Bussarawit, 22.04.1997; ZRC 2001.1128, 1 male, TL 47 mm, Phuket fishing pier, Andaman Sea, Thailand, trawled, sandy-mud, coll. S. Chaitiamvong *et al.*, Dec 1998.

Measurements

Males ($n = 2$) TL 47 mm.

Remarks

The specimens agree in most respects with published accounts. The 47 mm specimen bears five instead of four teeth on the dactylus of the raptorial claw. Both specimens in the present series were collected from sandy-mud substrates.

Distribution

Vietnam, the Gulf of Thailand, and now from Phuket.

Cloridina verrucosa (Hansen, 1926)

Squilla microphthalma.—Kemp and Chopra, 1921: 299 [part, not *S. microphthalma* H. Milne-Edwards, 1837].

Squilla verrucosa Hansen, 1926: 3, pl. 1: figs. 1a–d [type locality: Lesser Sunda Islands, Indonesia, 8°27'S, 122°54.5'E, by lectotype selection (Manning, 1976c)].

Squilla microphthalma.—Kemp and Chopra, 1921: 299–300 [Mergui Archipelago specimen, not *S. microphthalma* H. Milne-Edwards, 1837].

Squilla merguiensis Tiwari and Biswas, 1952: 350, fig. 1a [type locality: 6.4 km N of Kabusa Island, Mergui Archipelago, Andaman Sea].—Naiyanetr, 1980: 43.—Ghosh and Manning, 1988: 658.

Cloridina verrucosa.—Naiyanetr, 1998: 126.

Material examined

PMBC 16061, 1 male, TL 21 mm, BIOSHELF St. G2, 08°00'N, 098°10'E, OS, 63 m, coll. S. Bussarawit and C. Aungtonya, 23.04.1996; PMBC 16062, 1 female, TL 12 mm, between Rocha Yai Island and Kaew Noi Island, 60 m, coll. G. Dineson, 27.11.1997; PMBC 16063, 1 female, TL 27 mm, BIOSHELF St. J2, 07°15'N, 98°51'E, OS, 61 m, coll. S. Bussarawit and C. Aungtonya, 04.05.1996; PMBC 16064, 1 female, TL 13 mm, BIOSHELF St. L1, 06°45'N, 099°21'E, OS, 38 m, coll. S. Bussarawit and C. Aungtonya, 06.05.1996; PMBC 16065, 1 female, broken; CL 3.6 mm, BIOSHELF St. B1, 09°14'N, 098°00'E, OS, 45 m, coll. S. Bussarawit and C. Aungtonya, 17.02.1998; PMBC 16066, 1 female, TL 14 mm, BIOSHELF St. I2, 07°30'N, 098°29'E, OS, 60 m, coll. S. Bussarawit and C. Aungtonya, 03.05.1996; PMBC 16067, 1 male, TL 11 mm, 1 female, TL 11 mm, BIOSHELF St. K1, 07°00'N, 099°24'E, OS, 45 m, mud and shell fragments, coll. S. Bussarawit and C. Aungtonya, 06.05.1996; PMBC 16068, 1 female postlarva, TL 10 mm, BIOSHELF St. L1, 06°46'N, 099°21'E, OS, 38 m, coll. S. Bussarawit and C. Aungtonya, 06.05.1996;

PMBC 16069, 1 female, TL 13 mm, BIOSHELF St. I2, 07°30'N, 098°30'E, OS, 59 m, sandy–mud, coll. S. Bussarawit and C. Aungtonya, 22.02.1998; PMBC 16070, 1 female, TL 25 mm, Andaman Sea, BIOSHELF St. H2, 07°46'N, 098°16'E, OS, 40 m, coll. S. Bussarawit and C. Aungtonya, 20.02.1998; PMBC 16071, 2 males, TL 15–19 mm, BIOSHELF St. H1, 07°45'N, 098°16'E, OS, 31 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16072, 2 males, TL 14–16 mm, 1 female, TL 14 mm, BIOSHELF St. J1, 07°15'N, 099°04'E, OS, 39 m, coll. S. Bussarawit and C. Aungtonya, 23.02.1998; AM P60572, 2 males, TL 23–25 mm, BIOSHELF St. K1, 07°00'N, 099°16'E, OS, 41 m, coll. S. Bussarawit and C. Aungtonya, 24.02.1998; AM P60574, 3 males, TL 12–13 mm, BIOSHELF St. L2, 06°44'N, 099°05'E, OS, 56 m, coll. S. Bussarawit and C. Aungtonya, 05.05.1996.

Measurements

Male ($n = 11$) TL 11–25 mm, female ($n = 9$) TL 11–27 mm, female postlarva ($n = 1$) TL 10 mm.

Remarks

The adults in the present series of *C. verrucosa* agree well with published accounts (Hansen, 1926; Manning, 1976). In the postlarva and 11 mm juveniles, the mandibular palp is undeveloped. Additionally, the anterolateral margins of the carapace are angular, but unarmed in the postlarva. *Cloridina verrucosa* was taken on sandy–mud or mud with shell fragments at depths of 21–60 m.

Distribution

Indonesia, the Philippines, New Caledonia, Vietnam, the Mergui Archipelago, and now from Phuket.

Cloridopsis bengalensis (Tiwari and Biswas, 1952)

Squilla bengalensis Tiwari and Biswas, 1952: 352, fig. 1b, c [type locality: Bay of Bengal].

Cloridopsis bengalensis.—Manning, 1979: 396–397.—Naiyanetr, 1980: 42; 1998: 126.

Material examined

USNM 173097, 1 male, TL 106 mm, Nam Bor Bay, Phuket, Thailand, mangrove mud, coll. D. Frith, 24.06.1977.

Measurements

Male ($n = 1$) TL 106 mm.

Remarks

The present specimen was studied by Manning (1979).

Distribution

Bay of Bengal, India to Phuket, Thailand.

***Erugosquilla woodmasoni* (Kemp, 1911)**

Squilla wood-masoni Kemp, 1911: 99; 1913: 74–76, pl. V: figs. 63–65 [type locality: Madras, India].

Oratosquilla tweediei Manning, 1971b: 11–14, fig. 4 [type locality: Singapore].

Oratosquilla jakartensis Moosa, 1975: 13–17, fig. 1 [type locality: Jakarta Bay, Indonesia].

Oratosquilla woodmasoni.– Dingle *et al.*, 1977: 10, fig. 5b–d.– Manning, 1978d: 36–39, figs. 21–22.– Naiyanetr, 1980: 43; 1998: 126.

Material examined

PMBC 16073, 2 females, TL 109–130 mm, BIOSHELF St. A2, 09°30'N, 097°57'E, trawl, 43 m, coll. S. Bussarawit and C. Aungtonya, 18.04.1996; PMBC 16074, 2 females, TL 118–120 mm, Phuket, trawl, 34 m, 21.04.1997; PMBC 16075, 3 males, TL 99–125 mm, 2 females, TL 66–129 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; PMBC 16076, 1 male, TL 115 mm, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; QM25566, 1 male, TL 104 mm, 1 female, TL 92 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; ZRC 2001.1126, 1 female, TL 84 mm, Phuket fishing pier, Andaman Sea, Thailand, coll. S. Chaitiamvong *et al.*, Dec 1998; ZRC 1999.2075, 1 male, TL 90 mm, 1 female, TL 120 mm, Andaman Sea, Thailand, coll. P. Ng, 24.08.1999; ZRC 2001.1127, 2 males, TL

108–123 mm, Pichai Phuket, fish port, coll. P. Ng, Dec 1999; AMP58283, 6 males, TL 102–105 mm, 1 female, TL 98 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, coll. S. and R. Ah Yong, 24.11.1999.

Measurements

Male ($n = 14$) TL 99–125 mm, female ($n = 10$) TL 66–129 mm.

Remarks

Erugosquilla woodmasoni was reported from Phuket by Dingle *et al.* (1977). The present specimens of *E. woodmasoni* exhibit morphological variation as described by Manning (1978d): the submedian carinae of AS4 may or may not be armed, and the lobe between the terminal spines of the uropodal protopod varies from low and rounded to pointed and angular. Around Phuket, *Erugosquilla woodmasoni* burrows in sandy-mud from the shoreline to a depth of at least 70 m.

Distribution

Western Indian Ocean to Thailand, Indonesia, Vietnam, the Philippines, Taiwan, Japan and Australia.

***Fallosquilla fallax* (Bouvier, 1914)**

Squilla fallax Bouvier, 1914: 699 [type locality: Mauritius, 20°18'S, 57°35'E].

Squilla ambigua Hansen, 1926: 6, pl. 1: figs. 2a–e [type locality: east of Dangar Besar, Saleh-Bay, Indonesia, 8°26'S, 117°40'E].

Clorida fallax.– Naiyanetr, 1980: 43.

Fallosquilla fallax.– Naiyanetr, 1998: 127.

?*Levisquilla incerta*.– Naiyanetr, 1998: 127 [not *Levisquilla incerta* (Hansen, 1926)].

Material examined

PMBC 16077, 1 female, TL 50 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; PMBC 16078, 1 female, TL 20 mm, BIOSHELF St. PB7, 07°45'N, 098°41'E, box corer, 29 m, sand and shell fragments, coll. S. Bussarawit, 22.04.1997;

PMBC 16079, 1 female postlarva, TL 14 mm, BIOSHELF St. C1, 09°00'N, 098°03'E, BC, 40 m, muddy-sand and shell fragments, coll. S. Bussarawit and C. Aungtonya, 20.04.1996.

Measurements

Female ($n = 2$) TL 20–50 mm, female postlarva ($n = 1$) TL 14 mm.

Remarks

The two larger specimens agree well with published accounts (e.g. Manning, 1968; 1995). The postlarva differs from juveniles and adults in bearing a low median carina on the carapace and lacks anterolateral spines on the carapace. Postlarval *F. fallax* superficially resemble *Levisquilla incerta* (Hansen, 1926) and species of *Pontiosquilla* Manning, 1995, all of which lack anterolateral spines on the carapace. Naiyanetr's (1998) record of *L. incerta* from the Andaman Sea is probably based on postlarval *F. fallax*; unfortunately, the specimen on which the record is based could not be located for restudy. *Fallosquilla fallax* was taken on muddy-sand with shell fragments at depths of 28.6–40.0 m.

Distribution

Indo-West Pacific from Mauritius and the Comoro Islands (Manning, 1968), the Red Sea (Holthuis, 1967), Indonesia (Hansen, 1926), Vietnam, to the Solomon Islands (Manning, 1995).

Harpiosquilla annandalei (Kemp, 1911)

Squilla annandalei Kemp, 1911: 99 [type locality: Gulf of Martaban, Burma, 14°48'N, 95°52'E]; 1913: 3, 10, 24, 92, pl. 7, figs. 78–80.– Kemp and Chopra, 1921: 307.

Harpiosquilla annandalei.– Manning, 1969a: 5–9, pl. 27, figs. 1–3.– Naiyanetr, 1980: 42.

Material examined

PMBC 16080, 1 female, TL 98 mm, Phuket, fishing port, 40–80 m, coll. S. Chaitiamvong *et al.*, 08.12.1998; PMBC 16081, 1 female, TL 21 mm, off Phuket, BIOSHELF St. L2, 06°44'N, 099°05'E, OS, 56 m, coll. S. Bussarawit and C. Aungtonya,

05.05.1996; AM P58281, 2 females, TL 103–107 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, coll. S. and R. Ahyong, 24.11.1999.

Measurements

Female ($n = 4$) TL 21–107 mm.

Remarks

The present specimens of *H. annandalei* agree well with published accounts (Kemp, 1913; Manning, 1969a; 1995). Diagnostic characters for *H. annandalei* are fully developed by 21 mm: the TS8 sternal keel is pointed and inclined posteriorly, the submedian carinae on AS5 are armed posteriorly, and the apices of the submedian teeth of the telson are fixed. *Harpiosquilla annandalei* was trawled on muddy-sand at depths of 40–80 m.

Distribution

Japan, Taiwan and the South China Sea, to the western Indian Ocean (Manning 1995). A new record for Phuket.

Harpiosquilla harpax (de Haan, 1844)

Squilla harpax de Haan, 1844 (atlas): pl. 51, fig. 1 [type locality: Japan]; 1849: 222 (text).– Tiwari and Biswas, 1952: 358, figs. 3b, d, f.

Harpiosquilla harpax.– Manning, 1969a: 6, 25–33, figs. 28–38; 1995: 148, 153–158, pl. 28, figs. 90a, 92b, 93, 95, 96.– Naiyanetr, 1980: 42; 1998: 125.

Material examined

PMBC16082, 1 male, TL 173 mm, 4 females, TL 135–172 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; PMBC 16083, 1 female postlarva, TL 18 mm, BIOSHELF St. F1, 08°15'N, 098°10'E, OS, 43 m, coll. S. Bussarawit and C. Aungtonya, 16.02.1998; PMBC 16084, 1 male postlarva, TL 18 mm, BIOSHELF St. L2, 06°44'N, 099°04'E, TD, 59 m, coll. S. Bussarawit and C. Aungtonya, 25.02.1998; PMBC 16085, 1 male postlarva, TL 17 mm, BIOSHELF St. I1, 07°29'N, 098°56'E, TD, 40 m, coll. S. Bussarawit and C. Aungtonya, 03.05.1996; ZRC 1999.2080, 1 male,

TL 149 mm, Andaman Sea, Thailand, coll. P. Ng, 24.08.1999; AM P58280, 3 males, TL 107–129 mm, 5 females, TL 110–154 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, coll. P. Ng, Dec 1999.

Measurements

Male ($n = 5$) TL 107–173 mm, female ($n = 9$) TL 110–172 mm, male postlarvae ($n = 2$) TL 17–18 mm, female postlarva ($n = 1$) TL 18 mm.

Remarks

Most specimens agree well with previous accounts (Tiwari and Biswas, 1952; Manning, 1969a; 1995). Variation is present in the relative lengths of the lateral carina of the telson, which varies from being less than one third to about half the length of the marginal carina. The 135 mm female, differs from 'typical' *H. harpax* in lacking an anterior projection on the rostral plate; it otherwise agrees well with other specimens and bears a lateral carina of the telson measuring about one third of the length of the marginal carina. The postlarval specimens bear a median carina on the rostral plate and movable apices of the submedian teeth of the telson, as in postlarval *H. melanoura* reported below. The present specimens of *H. harpax* were collected from soft substrates at depths of 39.6–59.0 m. Manning (1969a) reported a bathymetric range of 2–93 m for *H. harpax*.

Distribution

Widely distributed in the Indo-West Pacific, from the western Indian Ocean to Japan and Australia. A new record for Phuket.

Harpisquilla melanoura Manning, 1968

Harpisquilla melanoura Manning, 1968b: 14, 18–21, fig. 5 [type locality: Banc de Pracel, W coast of Madagascar 17°00'S, 43°30'E]; 1969a: 6, 21–25, figs. 18–27.

Material examined

PMBC 16086, 2 males, TL 60–71 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–

44°N, 098°36–40°E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; PMBC 16087, 1 male, TL 42 mm, BIOSHELF St. A1, 09°30'N, 097°56'E, TD, 49 m, coll. S. Bussarawit and C. Aungtonya, 18.02.1998; AM P60566, 1 male, TL 140 mm, Phuket, fishing port, 40–80 m, coll. P. Ng *et al.*, 08.12.1998.

Measurements

Male ($n = 4$) TL 42–140 mm.

Remarks

Most specimens agree well with published accounts (Manning, 1968; 1969a; 1995). The 42 mm juvenile male differs from the adults in bearing a low median carina on the rostral plate, 9 instead of 8 teeth on the dactylus of the raptorial claw, and movable instead of fixed submedian teeth on the telson. The present specimens were trawled at depths between 32 and 40–80 m.

Distribution

Western Indian Ocean to Thailand, Vietnam and Australia. A new record for Phuket.

Lenisquilla lata (Brooks, 1886)

Squilla lata Brooks, 1886b: 21, 34–37, pl. 1: figs. 1–3 [type locality: Arafura Sea, 08°56'S, 136°05'E].–Kemp, 1913: 3, 10, 21, 37, pl. 2: fig. 24.

Squilloides latus spinosus Blumstein, 1970: 223, figs. 4, 5 [type locality: Gulf of Tonkin, 17°48'N, 109°32'E].

Squilloides espinosus Blumstein, 1974: 121, fig. 7 [type locality: Gulf of Tonkin, 18°00'N, 109°32'E].

Material examined

PMBC 16088, 1 female, TL 72mm, BIOSHELF St. T1, 07°02'N, 098°49'E, TD, 76 m, sandy–mud, coll. S. Bussarawit and C. Aungtonya, 24.02.1998; AM P60569, 1 female, TL 82mm, BIOSHELF St. T1, 07°02'N, 098°49'E, TD, 76 m, sandy–mud, coll. S. Bussarawit and C. Aungtonya, 24.02.1998.

Measurements

Female ($n = 2$) TL 72–82 mm.

Remarks

Both specimens were collected from sandy-mud at a depth of 76 m.

Distribution

Japan, New Caledonia, and Australia to the western Indian Ocean; for the first time from Thailand.

***Levisquilla jurichi* (Makarov, 1979)**

Clorida jurichi Makarov, 1979: 40, fig.1 [type locality: Tonkin Bay, Vietnam, 21°13.5'N, 109°45.8'E].

Material examined

PMBC 16089, 1 male, TL 14 mm, BIOSHELF St. A1, 09°30'N, 097°57'E, box corer, 43 m, sand with shell fragments, coll. S. Bussarawit and C. Aungtonya, 18.04.1996; PMBC 16090, 1 male, TL 17 mm, BIOSHELF St. K 20 m, 07°00'N, 099°24'E, box corer, 21 m, mud with shell fragments, coll. S. Bussarawit and C. Aungtonya, 06.05.1996; PMBC 16091, 1 male, TL 13 mm, BIOSHELF St. E 20 m, 08°30'N, 098°12'E, box core, 21 m, coll. S. Bussarawit and C. Aungtonya, 22.04.1996.

Measurements

Male ($n = 3$) TL 13–17 mm.

Remarks

The specimens agree well with published accounts (Makarov, 1979; Moosa, 1991). The petasma is well developed in the two larger specimens. The present series of *L. jurichi* were collected from mud or sand with shell fragments at depths of 20–43 m.

Distribution

Vietnam, New Caledonia and now from off Phuket.

***Miyakea nepa* (Latreille, 1828)**

Squilla nepa Latreille, 1828: 471 [type localities: China, and Pondicherry, India].– de Man, 1888b: 295–296.

Squilla Edwardsi Giebel, 1861: 320 [type locality: Insel Banka, Indonesia, 2°15'S, 106°00'E].

Oratosquilla nepa.– Naiyanetr, 1980: 43.

Miyakea nepa.– Naiyanetr, 1998: 128.

Material examined

PMBC 16092, 1 male, TL 85 mm, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16093, 1 male, TL 77 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; PMBC 16094, 2 males, TL 81–88 mm, 3 females, TL 116–123 mm, Phuket, fishing port, coll. S. Chaitiamvong *et al.*, Dec 1998; AM P58284, 1 male, TL 110 mm, 2 females, TL 72–140 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, 30–40 m, coll. S. and R. Ahyong, 24.11.1999.

Measurements

Male ($n = 5$) TL 77–110 mm, female ($n = 5$) TL 72–140 mm.

Remarks

Miyakea nepa was trawled on sandy-mud at depths of 30–70 m.

Distribution

Western Indian Ocean to Thailand including Phuket, Vietnam, Taiwan, the Philippines, New Caledonia, French Polynesia, and Australia.

***Oratosquillina gonypetes* (Kemp, 1911)**

Squilla gonypetes Kemp, 1911: 96 [type locality: restricted to vicinity of Cheduba Island, Burma, 18°48'N, 93°38'E, 13 m, by lectotype selection (Manning, 1978d)]; 1913: 3, 10, 22, 54, pl. 4, figs. 42–44 [part].– Kemp and Chopra, 1921: 300–301.

Oratosquilla gonypetes.—Manning, 1978d: 7, 12–14, fig. 5.—Naiyanetr, 1980: 43.

Oratosquillina gonypetes.—Naiyanetr, 1998: 128.

Material examined

PMBC 16095, 1 male, TL 23 mm, BIOSHELF St. PB6, 07°44'N, 098°33'E, TD, 34 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1996; PMBC 16096, 1 female, TL 23 mm, BIOSHELF St. C2, 09°00'N, 097°53'E, OS, 64 m, muddy-sand, coll. S. Bussarawit and C. Aungtonya, 20.04.1996; PMBC 16097, 1 female, TL 16 mm, BIOSHELF St. C3, 09°00'N, 097°43'E, BC, 79 m, sandy-mud, coll. S. Bussarawit and C. Aungtonya, 20.04.1996; PMBC 16098, 1 female, TL 15 mm, BIOSHELF St. I 20 m, 07°30'N, 099°01'E, BC, 21 m, mud, coll. S. Bussarawit and C. Aungtonya, 03.05.1996; PMBC 16099, 1 male, TL 19 mm, BIOSHELF St. I1, 07°30'N, 098°55'E, OS, 42 m, coll. S. Bussarawit and C. Aungtonya, 22.02.1998; PMBC 16100, 1 female, TL 24 mm, BIOSHELF St. L1, 07°49'N, 099°21'E, OS, 39 m, coll. S. Bussarawit and C. Aungtonya, 24.02.1998; PMBC 16101, 5 males, TL 38–63 mm, 9 females, TL 44–67 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; AM P60568, 3 males, TL 44–58 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998.

Measurements

Male ($n = 10$) TL 19–63 mm, female ($n = 13$) TL 16–67 mm.

Remarks

The present series agree well with Manning's (1978d) account of *O. gonypetes*. The apices of the dorsal processes of the antennular somite are acute, instead of rounded as mis-diagnosed by Manning (1995). *Oratosquillina gonypetes* was taken on mud or sand at depths of 20–79 m.

Distribution

Western Indian Ocean to the western Pacific. A new record for Phuket.

Oratosquillina inornata (Tate, 1883)

Squilla inornata Tate, 1883: 51, pl. 2 [type locality: Gulf of St. Vincent, South Australia, Australia].

Oratosquilla inornata.—Dingle *et al.*, 1977: 10, fig. 5e–g.

Material examined

PMBC 16102, 1 male, TL 80 mm, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16103, 1 male, TL 82 mm, Phuket, fishing port, 40–80 m, coll. S. Chaitiamvong *et al.*, 08.12.1998; AM P58279, 2 females, TL 94–95 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, coll. P. Ng, Dec 1999.

Measurements

Male ($n = 3$) TL 23–82 mm, female ($n = 2$) TL 94–95 mm, male postlarva ($n = 1$) TL 16 mm.

Remarks

The 16 mm postlarva lacks anterolateral spines on the carapace and the outer inferodistal spine on the merus of the raptorial claw is relatively undeveloped. *Oratosquillina inornata* constructs burrows in mudflats from the intertidal zone to at least 70 m depth. The species was reported from Phuket by Dingle *et al.* (1977).

Distribution

Australia and the eastern Indian Ocean, to Taiwan.

Oratosquillina manningi Ahyong, Chan and Liao, 2000

Oratosquillina manningi Ahyong, Chan and Liao, 2000: 42–47, figs. 1, 2 [type locality: Tai-Shi, Northeast Taiwan].

Material examined

PMBC 16105, 1 male, TL 60 m, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998; AM

P60567, 1 male, TL 71 mm, Andaman Sea, SW of Phuket, BIOSHELF St. PB7–6, 07°43–44'N, 098°36–40'E, trawl, 32 m, coll. S. Bussarawit and C. Aungtonya, 21.02.1998.

Measurements

Male ($n = 2$) TL 60–71 mm.

Remarks

The specimens agree well with type material. As with the type series of *O. manningi*, the present specimens were collected on a sandy-mud substrate, but at a shallower depth (32 m instead of 53–78 m).

Distribution

Taiwan, Australia and now the Andaman Sea.

Oratosquillina ornata (Manning, 1971)

Oratosquilla ornata Manning, 1971: 9, fig. 3 [type locality: Hong Kong, 21°53'N, 115°51'E].

Oratosquilla vietnamica Blumstein, 1974: 119, fig. 6 [type locality: Gulf of Tonkin, 18°00'N, 109°32'E].

Material examined

PMBC 16106, 1 male, TL 24 mm, BIOSHELF St. J2, 07°15'N, 098°48'E, OS, 63 m, coll. S. Bussarawit and C. Aungtonya, 23.02.1998; PMBC 16107, 1 female, TL 25 mm, BIOSHELF St. K2, 07°00'N, 099°04'E, OS, 53 m, coll. S. Bussarawit and C. Aungtonya, 24.02.1998.

Measurements

Male ($n = 1$) TL 24 mm, female ($n = 1$) TL 25 mm.

Remarks

The two juveniles agree in most respects with the type description of *O. ornata* (Manning, 1971). The petasma of the male is not fully developed, and the penes have not reached full length, but meet in the midline. The abdominal spination is as follows: SM 5–6, IM (2)4–6, LT (2)4–6, MG 1–5. Both specimens were taken on sandy-mud at depths of 53–63 m.

Distribution

South China Sea off Hong Kong, Vietnam and now from off Phuket, Thailand.

Oratosquillina perpensa (Kemp, 1911)

Squilla oratoria var. *perpensa* Kemp, 1911: 98 [part] [type locality: Hong Kong]; 1913: 70, pl. 5: figs. 57–59 [part].— Ghosh and Manning, 1988: 659.

Oratosquilla perpensa.— Manning, 1978d: 21–23, fig. 11.— Naiyanetr, 1980: 43.

Oratosquillina perpensa.— Naiyanetr, 1998: 128.

Material examined

PMBC 16108, 6 males, TL 50–85 mm, 2 females, TL 84–87 mm, Phuket, fishing port, coll. S. Chaitiamvong *et al.*, Dec 1998; PMBC 16109, 1 male, TL 84 mm, 1 female, TL 92 mm, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16110, 1 male, TL 24 mm, 1 female, TL 29 mm, BIOSHELF St. H1, 07°45'N, 098°16'E, OS, 31 m, mud, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; AM P58282, 2 males, TL 73–81 mm, 6 females, TL 80–90 mm, Andaman Sea off Phuket, Pichai fishing port, trawled, 30–40 m, sandy-mud, coll. S. and R. Ahyong, 24.12.1999; QM 25568, 1 male, TL 77 mm, 2 females, TL 81–82 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; USNM 143575, 1 male, TL 64 mm, 1 female, TL 63 mm, off Irrawaddy delta, Burma, 15°20'N, 94°55'E, 37 m, *Investigator* (paralectotypes of *Squilla perpensa* Kemp, 1911).

Measurements

Male ($n = 12$) TL 24–85 mm, female ($n = 13$) TL 29–92 mm.

Remarks

The present series from Phuket agrees well with the account given by Manning (1978d) and the paralectotypes from Burma, although the length of the rostral plate is variable. *Oratosquillina perpensa* was taken on sandy-mud at depths between 30–40 m and 70 m.

Distribution

Hong Kong, Vietnam, Malaysia, Singapore, the Gulf of Thailand, Burma and now from Phuket.

Oratosquillina quinquedentata (Brooks, 1886)

Squilla quinquedentata Brooks, 1886: 21, 26, pl. 1: fig. 3, pl. 2: fig. 6 [type locality: Arafura Sea, 09°59'S, 139°42'E].—Kemp, 1913: 52.
Oratosquilla quinquedentata.—Dingle *et al.*, 1977: 8, 10, fig. 5a.—Naiyanetr, 1980: 43.
Oratosquillina quinquedentata.—Naiyanetr, 1998: 128.

Material examined

PMBC 16111, 1 male, TL 82 mm, BIOSHELF St. H3, 07°45'N, 097°58'E, BC, 70 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996; PMBC 16112, 3 females, TL 98–124 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; QM W25567, 1 male, TL 113 mm, Phuket, fishing port, coll. P. Ng and P. Davie, Dec 1998; ZRC 1999.2087, 1 male, TL 104 mm, 2 females, TL 95–114 mm, Andaman Sea, Thailand, coll. P. Ng, 24.08.1999; AM P58288, 1 male, TL 128 mm, Phuket, fish port, coll. P. Ng, Dec 1999.

Measurements

Male ($n = 4$) TL 82–128 mm, female ($n = 5$) TL 95–124 mm.

Remarks

Previously reported from Phuket by Dingle *et al.* (1977) from intertidal mudflats to a depth of 50 m. The present specimens were taken on sandy-mud to a depth of at least 70 m.

Distribution

The Gulf of Thailand and Andaman Sea to northern Australia.

Oratosquillina subtilis (Manning, 1978)

Oratosquilla subtilis Manning, 1978d: 33–34, fig. 19 [type locality: off Visakhapatnam coast,

Madras, India].—Ghosh and Manning, 1988: 656.

Oratosquillina subtilis.—Manning, 1995: 225, 226.

Material examined

PMBC 16113, 1 male postlarva, TL 16 mm, between Hae Island and Maithon Island, BIOSHELF St. NBD, 07°44'N, 098°24'E, OS, 40 m, coarse sand, coll. N. Bruce and G. Dinesen, 09.12.1997; PMBC 16114, 1 male, TL 22 mm, 1 female, TL 20 mm, BIOSHELF St. H1, 07°45'N, 098°16'E, OS, 31 m, coll. S. Bussarawit and C. Aungtonya, 09.05.1996.

Measurements

Male ($n = 2$) TL 22 mm, female ($n = 1$) TL 20 mm, male postlarva ($n = 1$) TL 16 mm.

Remarks

The two larger specimens agree well with the type description (Manning, 1978d). The smallest specimen bears fewer armed abdominal carinae than adults (SM 6, IM 4–6, LT 4–6, MG 1–5) and the mandibular palp is present only as a short bud. The present specimens were collected from coarse sand or mud at depths of 31–40 m.

Distribution

New Caledonia, the Philippines, Indonesia, and Burma to India (Manning, 1995). A new record for Thailand.

Toshimitsu tiwarii (Blumstein, 1974)

?*Squilla costata*.—Kemp and Chopra, 1921: 303 [not *Squilla costata* de Haan].

Squilla sp. prox. *costata*.—Tiwari and Biswas, 1952: 354, fig. 2.

Lophosquilla tiwarii Blumstein, 1974: 123–124, fig. 8 [type locality: Gulf of Tonkin, Vietnam, 20°20'N, 108°25'E].—Ghosh and Manning, 1988: 655.

Toshimitsu tiwarii.—Manning, 1995: 235–236, fig. 142.—Naiyanetr, 1998: 128.

Material examined

PMBC 16115, 1 male, TL 21 mm, BIOSHELF St. L1, 06°45'N, 099°21'E, BC, 38 m, sandy-mud, coll. S. Bussarawit and C. Aungtonya, 06.05.1996.

Measurements

Male ($n = 1$) TL 21 mm.

Remarks

The single specimen was taken from sandy-mud at a depth of 38 m.

Distribution

Vietnam, the Philippines, Indonesia, Burma, and now Phuket.

DISCUSSION

Eighty-one species of stomatopods are now known from the Andaman Sea in 11 families and five superfamilies. Eleven species reported herein represent new records for the entire Andaman Sea. Forty-eight species of stomatopods are now known from Phuket, of which 26 are new records based on Naiyanetr (1998). Consequently, the results of this study increase the known stomatopod fauna of the Andaman Sea by 16% and that of Phuket by 118%. Eight species represented here are also new records for the Indian Ocean, namely *Faughnia formosae*, *Gonodactylellus annularis*, *Oratosquilla manningi*, *O. ornata*, *Levisquilla jurichi*, *Clorida gaillardi*, *Cloridina pelamidae*, and *Coronidopsis serenei*.

Manning (1989) reported 132 species from the Indian Ocean. Since 1989, only four additional species have been described from the Indian Ocean (Manning, 1990a; 1990b; Ah Yong, 1998). Hence, the stomatopod fauna of the Andaman Sea represents a substantial proportion of the known Indian Ocean fauna—almost 60%.

Most species reported herein were collected via trawling on soft substrates. Consequently, squilloids dominated samples. The largest proportion of new records for Phuket (20 of 28) are squilloids and these were collected by trawl or dredge. Relatively little collecting effort in coral-reef environments around Phuket accounts for the smaller proportion of gonodactyloids collected. The large increase in the known fauna as the result of the limited sampling conducted for present study suggests that the stomatopod fauna is not yet well characterized. Moreover, the fact that several species newly reported from the Indian Ocean also represent significant range extensions suggest that intermediate localities are also poorly sampled. Particular attention should be paid to the coral-reef stomatopods which are generally smaller and more difficult to collect than species living on soft substrates.

Checklist of Stomatopoda known from the Andaman Sea.

The checklist below includes all stomatopod species known from the Andaman Sea. New records for Phuket are indicated *, and new records for both Phuket and the Andaman Sea are indicated **. Moosa (1986) synonymized *Chorisquilla andamanica* Manning, 1975, with *C. excavata* (Miers, 1880) based on similar telson morphology. *Chorisquilla andamanica*, however, is a distinct species and differs from *C. excavata* in lacking posterolateral spines on AS6. Naiyanetr's (1998) record of *C. excavata* from the Andaman Sea is based on *C. andamanica*. *Mesacturoides brevisquamatus* (Paulson, 1875) is included in the fauna of the Andaman Sea following Kemp (1913), but as noted by Manning (1962), the record is probably based on *M. fimbriatus* (Lenz, 1905).

Eurysquilloidea Manning, 1977**Eurysquillidae** Manning, 1977

Coronidopsis bicuspis Hansen, 1926. Andaman Sea (Manning and Garcia, 1982; Makarov, 1976; Naiyanetr, 1998).

***Coronidopsis serenei* (Moosa, 1973). Off Phuket (present record).

Manningia andamanensis Ghosh, 1975. Aerial Bay, North Andaman Island, Andaman Sea (Ghosh, 1975; Ghosh and Manning, 1988).

Manningia australiensis Manning, 1970. Phuket (Naiyanetr, 1983, 1998) as *M. thorsoni* Naiyanetr.

Manningia pilaensis (de Man, 1888). Elphinstone Island, Mergui Archipelago (de Man, 1888b; Kemp, 1913).

Gonodactyloidea Giesbrecht, 1910**Gonodactylidae** Giesbrecht, 1910

Gonodactylaceus falcatus (Forskål, 1775). Kemp (1913); Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).

Gonodactylaceus ternatensis (de Man, 1902). Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).

Gonodactylellus affinis (de Man, 1902). Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980); Racha Noi Island, off Phuket (present record).

***Gonodactylellus annularis* Erdmann and Manning, 1998. Racha Noi Island, off Phuket (present record).

Gonodactylinus viridis (Serène, 1954). Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).

Gonodactylus acutirostris de Man, 1898. Mergui Archipelago (de Man, 1898).

Gonodactylus chiragra (Fabricius, 1781). Mergui Archipelago (de Man, 1888b); Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998, present record); Andaman Sea (Naiyanetr, 1980); Hnai Island, Satun, Andaman Sea (present record).

Gonodactylus platysoma Wood-Mason, 1895. Port Blair, Andaman Islands (Wood-Mason, 1895; Kemp, 1913); Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).

Gonodactylus smithii Pocock, 1893. Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980); Sak Island, Andaman Sea (present record).

Odontodactylidae Manning, 1980

Odontodactylus brevirostris (Miers, 1884). Andaman Islands (Kemp, 1913; Ghosh and Manning, 1988)

***Odontodactylus japonicus* (de Haan, 1844). Off Phuket (present record).

Odontodactylus scyllarus (Linnaeus, 1758). Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).

***Raoulius cultrifer* (White, 1851). Off Phuket (present record).

Protosquillidae Manning, 1980

Chorisquilla andamanica Manning, 1975. Andaman Islands (Kemp, 1913; Manning, 1969c, 1975; Ghosh and Manning, 1988).

- Chorisquilla gyrosa* (Odhner, 1923). Brooksabad, Andaman Islands (Kemp, 1913; Manning, 1969c).
Chorisquilla spinosissima (Pfeffer, 1888). Port Blair, Andaman Islands (Kemp and Chopra, 1921).
Haptosquilla glabra (Lenz, 1905). Great Coco Island, Andaman Islands (Kemp, 1913); Camorta Island (Chopra, 1934); Ross Island, Andaman Islands (Tiwari and Biswas, 1952).
Haptosquilla glyptocercus (Wood-Mason, 1875). Great Coco Island, N Andamans, Kabusa Island, Mergui Archipelago, Kemp (1913); Port Blair, Andaman Islands (Kemp and Chopra, 1921; Manning, 1969c); Nancouri Harbour, Andaman Islands (Tiwari and Biswas, 1952); Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998; present record); Andaman Sea (Naiyanetr, 1980).
Haptosquilla pulchella (Miers, 1880). Camorta Island, Nicobars (Chopra, 1934); Phuket (Naiyanetr, 1998).
Haptosquilla tuberosa (Pocock, 1893). Andaman Islands (Kemp, 1911, 1913; Manning, 1969c; Ghosh and Manning, 1988); Nicobar Islands (Chopra, 1934; Manning, 1969c); off Phuket (present record).
Siamosquilla hyllebergi Naiyanetr, 1989. Similan Island, Surin Island, Phangnga, Andaman Sea (Naiyanetr, 1998).

Pseudosquillidae Manning, 1977

- Pseudosquilla ciliata* (Fabricius, 1787). Andaman Islands (Kemp, 1913); Outram Island, Nicobars (Chopra, 1934); Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998; present record); Andaman Sea (Naiyanetr, 1980).

Takuidae Manning, 1995

- Mesacturoides brevisquamatus* (Lenz, 1905). Mergui (Kemp, 1913).

Lysiosquilloidea Giesbrecht, 1910

Lysiosquillidae Giesbrecht, 1910

- Lysiosquilla sulcirostris* Kemp, 1913. Andaman Islands (Kemp, 1913).
Lysiosquilla tredecimdentata Holthuis, 1941. Andaman Islands (Manning, 1978b), Andaman Sea (Naiyanetr, 1980), Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998; present record).
Lysiosquillina lisa Ahyong and Randall, 2001, Similan Islands, Andaman Sea (Debelius, 1999; Ahyong and Randall, 2001).
Lysiosquillina maculata (Fabricius, 1793). Nicobar Islands, Andaman Islands (Kemp, 1913, part); Phuket, Phangnga (Naiyanetr, 1998).

Nannosquillidae Manning, 1980

- Acanthosquilla multifasciata* (Wood-Mason, 1895). Phuket (Dingle *et al.*, 1977; Naiyanetr, 1998); Andaman Sea (Naiyanetr, 1980).
 ***Acanthosquilla phalangium* (Fabricius, 1768). Port Blair, Andamans (Kemp, 1913, as *Lysiosquilla acanthocarpus* (Claus)); Naiyang Beach, Phuket (present record).
Acanthosquilla tigrina (Nobili, 1903). Andaman Sea (Naiyanetr, 1980); Naiyang Beach, Phuket (present record).
Pullosquilla thomassini Manning, 1978. Kamala Bay, Phuket (Naiyanetr, 1998).

Tetrasquillidae Manning and Camp, 1993

Heterosquilloides insignis (Kemp, 1911). Off North Andaman Island (Kemp, 1911, 1913; Ghosh and Manning, 1988).

Parasquilloidea Manning, 1995**Parasquillidae** Manning, 1995

***Faughnia formosae* Manning and Chan 1997. Off Phuket (present record).

Squilloidea Latreille, 1802**Squillidae** Latreille, 1802

- Areosquilla indica* (Hansen, 1926). Octavia Bay, Nancoury harbour, Nicobars (Chopra, 1934).
 **Anchisquilla fasciata* (de Haan, 1844). Andaman Islands, Mergui Archipelago (Kemp, 1913); Andaman Sea (Naiyanetr, 1980); Satun, Andaman Sea (Naiyanetr, 1998); off Phuket (present record).
Busquilla quadraticauda (Fukuda, 1911). Gulf of Martaban (Kemp, 1911, 1913, as *Squilla boops* Kemp)
 **Carinosquilla multicarinata* (White, 1849). Andaman Sea (Naiyanetr, 1980), off Phuket (present record).
 ***Carinosquilla spinosa* sp.nov. Off Phuket (present record).
Clorida decorata Wood-Mason, 1895. Port Blair, Andaman Islands (Wood-Mason, 1895; Kemp, 1913; Ghosh and Manning, 1988); off Irrawaddy Delta and Ye River entrance, lower Burma (Kemp, 1913); Jack and Una Island, Mergui Archipelago (Kemp and Chopra, 1921).
 ***Clorida gaillardii* Moosa, 1986. Off Phuket (present record).
 **Clorida albolitura* Ahyong and Naiyanetr, 2000. Off Phuket (Ahyong and Naiyanetr, 2000).
Clorida rotundicauda (Miers, 1880). Andaman Sea (Naiyanetr, 1980); Nam Bor Bay, Phuket (Manning, 1979).
 **Cloridina chlorida* (Brooks, 1886). Andaman Sea (Naiyanetr, 1980, 1998); off Phuket (present record).
 **Cloridina ichneumon* (Fabricius, 1798). Andaman Sea (Naiyanetr, 1980, 1998, as *C. microphthalmama* (H. Milne-Edwards)); off Phuket (present record).
Cloridina malaccensis (Moosa, 1973). Andaman Sea (Naiyanetr, 1980).
 ***Cloridina pelamidae* (Blumstein, 1970). Off Phuket (present record).
 **Cloridina verrucosa* (Hansen, 1926). Mergui Archipelago (Tiwari and Biswas, 1952; Ghosh and Manning, 1988; as *C. merguiensis* Tiwari and Biswas); Andaman Sea (Naiyanetr, 1980, as *C. merguiensis* Tiwari and Biswas, 1998); off Phuket (present record).
Cloridopsis bengalensis (Tiwari and Biswas, 1952). Phuket (Manning, 1979); Andaman Sea (Naiyanetr, 1980, 1998).
Cloridopsis immaculata (Kemp, 1913). Ranong (Naiyanetr, 1998).
Cloridopsis scorpio (Latreille, 1828). Satun, Ranong (Naiyanetr, 1998).
Dictyosquilla foveolata (Wood-Mason, 1895). Ye River entrance and off Amherst Island, Burma (Kemp, 1913).
Erugosquilla woodmasoni (Kemp, 1911). Andaman Sea (Naiyanetr, 1980); Phuket, Krabi (Naiyanetr, 1998); off Phuket (Dingle *et al.*, 1977, present record).
 **Fallosquilla fallax* (Bouvier, 1914). Andaman Sea (Naiyanetr, 1980, 1998); off Phuket (present record).

- **Harpiosquilla annandalei* (Kemp, 1911). Gulf of Martaban (Kemp, 1911, 1913); Mergui Archipelago (Manning, 1969a); NNE of Kabusa Island, Mergui Archipelago (Kemp and Chopra, 1921); Andaman Sea (Naiyanetr, 1980); off Phuket (present record).
- **Harpiosquilla harpax* (de Haan, 1844). Andaman Sea (Naiyanetr, 1980); Kantang, Trang, Satun, Andaman Sea (Naiyanetr, 1998); off Phuket (present record).
- Harpiosquilla indica* Manning, 1969a. Aerial Bay, North Andaman Island (Gosh, 1976).
- **Harpiosquilla melanoura* Manning, 1968. Mergui Archipelago and off Burma (Manning, 1969a); off Phuket (present record).
- Harpiosquilla raphidea* (Fabricius, 1798). Port Blair, Andaman Islands, Mergui Archipelago (de Man, 1888b; Kemp, 1913); Andaman Sea (Naiyanetr, 1980). Satun, Ranong (Naiyanetr, 1998).
- **Lenisquilla lata* (Brooks, 1886). Gulf of Martaban (Kemp, 1913); off Phuket (present record).
- Leptosquilla schmeltzii* (A. Milne-Edwards, 1873). Port Blair, Andaman Islands (Kemp, 1913).
- Levisquilla incerta* (Hansen, 1926). Andaman Sea (Naiyanetr, 1998) (but see remarks under account of *Fallosquilla fallax*).
- Levisquilla inermis* (Manning, 1965). Andaman Sea (Naiyanetr, 1980, 1998).
- Levisquilla minor* (Jurich, 1904). Andaman Sea (Naiyanetr, 1998).
- ***Levisquilla jurichi* (Makarov, 1979). Off Phuket (present record).
- Miyakea nepa* (Latreille, 1828). King Island Bay, Mergui Archipelago (de Man, 1888b); Andaman Sea (Naiyanetr, 1980); Satun, Phuket, Krabi, Andaman Sea (Naiyanetr, 1998); off Phuket (present record).
- **Oratosquillina gonypetes* (Kemp, 1911). Andaman Islands (Kemp, 1911, 1913; Ghosh and Manning, 1988); Andaman Sea (Naiyanetr, 1980, 1998); off Phuket (present record).
- Oratosquillina interrupta* (Kemp, 1911). Andaman Sea (Naiyanetr, 1980, 1998).
- Oratosquillina inornata* (Tate, 1883). Off Phuket (Dingle *et al.*, 1977; present record).
- ***Oratosquillina manningi* Ahyong, Chan and Liao, 2000. Off Phuket (present record).
- ***Oratosquillina ornata* (Manning, 1971). Off Phuket (present record).
- **Oratosquillina perpensa* (Kemp, 1911). Mergui Archipelago; Port Blair, Andaman Islands; off Irrawaddy Delta, Burma (Kemp, 1913; Manning, 1978d; Ghosh and Manning, 1988); Andaman Sea (Naiyanetr, 1980, 1998); off Phuket (present record).
- Oratosquillina quinquentata* (Brooks, 1886). Andaman Sea (Naiyanetr, 1980, 1998); off Phuket (Dingle *et al.*, 1977, present record).
- **Oratosquillina subtilis* (Manning, 1978). Off Phuket (present record); off Kabusa Island, Burma (Manning, 1978d; Ghosh and Manning, 1988).
- Squilloides leptosquilla* (Brooks, 1886). NW of Andamans, S of Port Blair, Andaman Islands (Kemp, 1913).
- Squilloides tenuispinis* (Wood-Mason, in Wood-Mason and Alcock, 1891). Off Andaman Islands (Wood-Mason and Alcock, 1891; Kemp, 1913).
- **Toshimitsu tiwarii* (Blumstein, 1974). NNE of Kabusa Island, Mergui Archipelago (Kemp and Chopra, 1921, as ?*Squilla costata* de Haan; Ghosh and Manning, 1988); off Phuket (present record).

ACKNOWLEDGEMENTS

We wish to thank Matz Berggren, Niel Bruce, Somchai Bussarawit and Charatsee Aungtonya for facilitating access to the BIOSHELF collections. Thanks are due to Somnuk Chaitiamvong, Peter

Davie, and Peter Ng for making collections in Phuket, 1998, and to Rachel Ahyong for assisting one of us (STA) with fieldwork in Phuket, 1999. Peter Ng (ZRC) and Charles Fransen (NNM) also kindly provided complete access to the stomatopod collections in their care.

REFERENCES

- Ahyong, S. T. 1998. Review of *Neoanchisquilla* Moosa, 1991 and *Neclorida* Manning, 1995 (Crustacea: Stomatopoda: Squilloidea), with descriptions of two new species of *Neoanchisquilla* from the Indian Ocean. *Records of the Australian Museum* **50**(2): 217–229.
- (in press). Revision of the Australian Stomatopod Crustacea. *Records of the Australian Museum, Supplement* 26.
- Ahyong, S. T., T. Y. Chan and Y. J. Liao. 2000. *Oratosquillina manningi*, a new species of stomatopod from Taiwan and Australia. *Journal of Crustacean Biology* **20** (special issue 2): 42–47.
- Ahyong, S. T. and P. Naiyanetr. 2000. Revision of the *Clorida latreillei* species complex with description of a new species (Squillidae: Stomatopoda). *Raffles Bulletin of Zoology* **48**(2): 313–325.
- Ahyong, S. T. and J. E. Randall. (2001). *Lysiosquillina lisa*, a new species of mantis shrimp from the Indo-West Pacific (Stomatopoda: Lysiosquillidae). *Journal of South Asian Natural History* **5**(2): 135–140.
- Berthold, A. A. 1845. Ueber verschiedene neue oder seltene Reptilien aus Neue-Granada und Crustaceen aus China. *Gesellschaft der Wissenschaften zu Göttingen, Nachrichten*, **1845**: 37–48.
- Blumstein, R. 1970. New stomatopod crustaceans from the Gulf of Tonkin, South China Sea. *Crustaceana* **18**(2): 218–224.
- 1974. Stomatopod crustaceans from the Gulf of Tonkin with the description of new species. *Crustaceana* **26**(2): 112–126.
- Borradaile, L. A. 1900. On the Stomatopoda and Macrura brought by Dr Willey from the South Seas. **In**: A. Willey (ed.). *Zoological Results based on the material from New Britain, New Guinea, Loyalty Islands and elsewhere, collected during the years 1895, 1896, and 1897*, vol 4, pp. 395–428, pls. 36–39. Cambridge University Press.
- 1907. Stomatopoda from the western Indian Ocean. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of J. Stanley Gardiner. *Transactions of the Linnean Society of London* (2, Zoology) **12**: 209–216, pl. 22.
- Bouvier, E.-L. 1914. Sur la faune carcinologique de l'île Maurice. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, Paris* **159**: 698–704.
- Brooks, W. K. 1886. Report on the Stomatopoda collected by H.M.S. Challenger during the years 1873–76. *The Voyage of the H.M.S. Challenger, Zoology* **16**: 1–116, pls. 1–16.
- Chopra, B. 1934. On the stomatopod Crustacea collected by the Bengal Pilot Service off the mouth of the River Hughli, together with notes on some other forms. *Records of the Indian Museum* **36**: 17–43.
- Clark, P. F., K. Harrison and S. Goodman. 1990. Decapoda and Stomatopod by De Man: 1887 or 1888? *Archives of Natural History* **17**(1): 79–80.
- Claus, C. 1871. Die Metamorphose der Squilliden. *Abhandlungen der königlichen Gessellschaft der Wissenschaften zu Göttingen* **16**: 111–163.
- Dingle, H., R.L. Caldwell and R.B. Manning. 1977. Stomatopods of Phuket Island, Thailand. *Phuket Marine Biological Center Research Bulletin* **20**: 1–20.
- Erdmann, M. V. and R.B. Manning 1998. Preliminary descriptions of nine new stomatopod Crustaceans from coral reef habitats in Indonesia and Australia. *Raffles Bulletin of Zoology* **46**(2): 615–626.
- Eydoux, F., and L. F. A. Souleyet. 1842. Crustacés. *Voyage autour du Monde exécuté pendant les années 1836 et 1837 sur la Corvette La Bonite Commandée par M. Vaillant, Capitaine de Vaisseau, Zoologie* **1**: 219–272, pl. 5. Arthus Bertrand, Paris.
- Fabricius, J.C. 1781. *Species Insectorum Exhibentes Eorum Differentias Specificas, Synonyma Auctorum, Loca Natalia, Metamorphosin Adiectis, Observationibus, Descriptionibus* 1. Hamburgii et Kilonii. 552 pp.
- Fabricius, J. C. 1787. *Mantissa insectorum sistens eorum species nuper detectas: adiectis characteribus genericis, differentiis specificis, emendationibus, observationibus*. *Proft Hafniae* **1**: 1–348.

- Fabricius, J. C. 1793. *Entomologia Systematica Emendata et Aucta. Secundum Classes, Ordines, Genera, Species. Adjectis Synonymis, Locis, Observationibus, Descriptionibus*, 2. Hafniae. 519 pp.
- 1798. *Supplementum Entomologiae Systematicae*. Hafniae. 572 pp.
- Forskål, P. 1775. *Descriptiones Animalium, Avium, Amphiborum, Piscium, Insectorum, Vermium*, 19 + xxxii + 164 pp. (Hauniae, Copenhagen).
- Ghosh, H. C. 1975. A new species of *Manningia* (Stomatopoda, Gonodactylidae) from the Andaman Islands. *Crustaceana* **28**(1): 33–36.
- 1976[for 1975]. Two new records of stomatopods with description of a female *Harpiosquilla indica* Manning, 1969 [Stomatopoda: Squillidae]. *Records of the Zoological Survey of India* **71**: 51–55.
- 1990. Stomatopoda: Crustacea. *Fauna of Lakshadweep*. State Fauna Series **2**: 199–212.
- Ghosh, H. C. and R.B. Manning. 1990. Types of stomatopod Crustaceans in the Zoological Survey of India. *Proceedings of the Biological Society of Washington* **101**(3): 653–661.
- Giebel, C. 1861. Neue *Squilla* von der Insel Banka. *Zeitschrift für Gesamten Naturwissenschaften* **18**: 319–320.
- Giesbrecht, W. 1910. Stomatopoden, Erster Theil. *Fauna und Flora des Golfes von Neapel Monographie* **33**: i–vii, 1–239, pls. 1–11.
- Haan, W. de 1833–1850. Crustacea (in) von Siebold, Ph. F., *Fauna Japonica sive descriptio animalium, quae in itinere per Japoniam, jussu et auspiciis superiorum, qui summum in India Batavia Imperium tenent, suscepto, annis 1823–1830 collegit, notis observationibus et adumbrationibus illustravit*. Lugdunum Batavorum: A. Arnz. 243 pp.
- Hansen, H. J. 1926. The Stomatopoda of the Siboga Expedition. *Siboga-Expeditie, monographe* **35**: 1–48, pls. 1–2.
- Holthuis, L. B. 1941. The Stomatopoda of the Snellius Expedition. *Biological Results of the Snellius Expedition XII. Temminckia* **6**: 241–294.
- 1967. The stomatopod Crustacea collected by the 1962 and 1965 Israel South Sea Expeditions. The Second Israel South Red Sea Expedition, 1965, Report No.1. *Israel Journal of Zoology* **16**: 1–45.
- Ingle, R. W. 1963. Crustacea Stomatopoda from the Red Sea and Gulf of Aden (Contributions to knowledge of the Red Sea, Number 26). *Bulletin, Sea Fisheries Research Station (Haifa)* **33**: 1–69.
- Jurich, B. 1904. Die Stomatopoden der Deutsche Tiefsee-Expedition. *Wiss. Ergeb. Deutsch. Tiefsee-Exped. "Valdivia,"* **7**: 361–408, pl. XXVI (II).
- Kemp, S. 1911. Preliminary descriptions of new species and varieties of Crustacea Stomatopoda in the Indian Museum. *Records of the Indian Museum* **6**(2): 93–100.
- 1913. An account of the Crustacea Stomatopoda of the Indo-Pacific region, based on the collection in the Indian Museum. *Memoirs of the Indian Museum* **4**: 1–217, figs. 1–10, pls. 1–10.
- Kemp, S. and B. Chopra. 1921. Notes on Stomatopoda. *Records of the Indian Museum* **22**: 297–311.
- Lamarck, J. B. P. A. de. 1818. *Histoire naturelle des animaux sans vertèbres présentant les caractères généraux et particuliers de ces animaux, leur distribution, leur classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une introduction offrant la détermination des caractères essentiels, de l'animal, sa distinction du végétal et des autres corps naturelles, enfin, l'exposition des principes fondamentaux de la zoologie* 5. Deterville, Paris. 612 pp.
- Lanchester, W. F. 1903. Stomatopoda, with an account of the varieties of *Gonodactylus chiragra*. *Marine Crustaceans VIII*. In: J. S. Gardiner (ed.). *The fauna and geography of the Maldive and Laccadive Archipelagoes: being the account of the work carried on and of the collections made by an expedition during the years 1899 and 1900*, **1**: 444–459.
- Latreille, P. A. 1802. *Histoire naturelle, générale et particulière, des Crustacés et des Insectes* 3. F. Dufart, Paris. 467 pp.

- Latreille, P. A. 1828. Squille, Squilla. Encyclopédie Méthodique. Entomologie ou Histoire naturelle des Crustacés, des Arachnides et des Insectes **10**: 467–475. Agasse, Paris.
- Lenz, H. 1905. Ostafrikanische Dekapoden und Stomatopoden gesammelt von Herrn Prof. Dr. A. Voeltzkow. **In**: A. Voeltzkow (ed.). Wissenschaftliche Ergebnisse der Reisen in Madagaskar und Ostafrika in den Jahren 1889–95, volume 3. Abhandlungen der Senckenbergischen naturforschenden Gesellschaft **27**(4): 341–392, pls. 47, 48.
- Linnaeus, C. 1758. Systema Naturae per Regna Tria Naturae, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis Locis. Edition 10, vol. 1. Holmiae. 824 pp.
- Makarov, R. R. 1976. A new species of the rare genus of mantis shrimps *Coronidopsis andamanensis* sp.n. (Crustacea, Stomatopoda). Zoologicheskij zhurnal **55**(12): 1908–1912.
- 1978. New data on crustaceans of the families Lysiosquillidae and Gonodactylidae (Crustacea, Stomatopoda) from Tonkin Bay (Vietnam). Zoologicheskij zhurnal **57**: 176–189 [in Russian].
- Makarov, R. R. 1979. A collection of stomatopod crustaceans of the genus *Clorida* Eydoux and Souleyet, 1842, from Tonkin Bay, Vietnam. Crustaceana **37**(1): 39–56.
- Man, J. G. de. 1888a (1887–1888). Bericht über die von Herrn Dr. J. Brock im indischen Archipel gesammelten Decapoden und Stomatopoden. Archiv für Naturgeschichte **53** (I, 2): 215–288, pls. 7–10 [issued 1887]; **53** (I, 3): 289–600, pls. 11–22a [issued 1888] [fide Clark *et al.*, 1990].
- 1888b. Report on the podophthalmous Crustacea of the Mergui Archipelago, collected for the trustees of the Indian Museum, Calcutta, by Dr. John Anderson, F.R.S., Superintendent of the Museum. Journal of the Linnean Society, London, (Zoology) **22**: 1–312, pls. 1–19.
- 1898. Bericht über die von Herrn Schiffscapitän Storm zu Atjeh, an den westlichen Küsten von Malakka, Borneo and Celebes sowie in der Java-See gesammelten Decapoden und Stomatopoden, sechster (schluss-) Theil. Zoologische Jahrbücher, Abtheilung für Systematik, Geographie und Biologie der Thiere **10**: 677–708, pls. 28–38.
- 1902. Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. **In**: W. Kükenthal (ed.). Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo. Abhandlungen der Senckenbergischen naturforschenden Gesellschaft **25**: 467–929, pls. 19–27.
- Manning, R. B. 1962. Stomatopod Crustacea collected by the Yale Seychelles Expedition, 1957–1958. Postilla **68**: 1–15.
- 1965. Stomatopoda from the collection of His Majesty The Emperor of Japan. Crustaceana **9**(3): 249–262, pls. 11, 12.
- 1967. Review of the genus *Odontodactylus* (Crustacea: Stomatopoda). Proceedings of the United States National Museum **123**: 1–35.
- 1968. Stomatopod Crustacea from Madagascar. Proceedings of the United States National Museum **124**: 1–61.
- 1969a. A revision of the genus *Harpisquilla* (Crustacea, Stomatopoda), with descriptions of three new species. Smithsonian Contributions to Zoology **36**: 1–41.
- 1969b. Stomatopod Crustacea of the western Atlantic. Studies in Tropical Oceanography, Miami **8**: viii + 380 pp.
- 1969c. Notes on the *Gonodactylus* section of the family Gonodactylidae (Crustacea, Stomatopoda), with descriptions of four new genera and a new species. Proceedings of the Biological Society of Washington **82**: 143–166.
- 1970. A new genus and species of stomatopod crustacean from Madagascar. Bulletin du Muséum National d'Histoire Naturelle, Paris, séries 2, **42** (1): 206–209.
- 1971. Keys to the species of *Oratosquilla* (Crustacea: Stomatopoda), with descriptions of two new species. Smithsonian Contributions to Zoology **71**: 1–16.
- 1975. Two new species of the Indo-West Pacific genus *Chorisquilla* (Crustacea, Stomatopoda), with notes on *C. excavata* (Miers). Proceedings of the Biological Society of Washington **88**: 253–261.

- Manning, R. B. 1976. Redescriptions of *Oratosquilla indica* (Hansen), with accounts of a new genus and two new species (Crustacea, Stomatopoda). *Beaufortia* **25** (318): 1–13.
- 1977. A monograph of the West African stomatopod Crustacea. *Atlantide Report* **12**: 25–181.
- 1978a. Notes on some species of the *Falcatus* group of *Gonodactylus* (Crustacea: Stomatopoda: Gonodactylidae). *Smithsonian Contributions to Zoology* **258**: 1–15.
- 1978b. Synopses of the Indo-West Pacific species of *Lysiosquilla* Dana, 1852 (Crustacea: Stomatopoda: Lysiosquillidae). *Smithsonian Contributions to Zoology* **259**: 1–16.
- 1978c. New and rare stomatopod crustacea from the Indo-West Pacific region. *Smithsonian Contributions to Zoology* **264**: 1–36.
- 1978d. Further observations on *Oratosquilla*, with accounts of two new genera and nine new species (Crustacea: Stomatopoda: Squillidae). *Smithsonian Contributions to Zoology* **272**: 1–44.
- 1979. Notes on two species of stomatopod Crustacea from Phuket Island, Thailand. *Proceedings of the Biological Society of Washington* **92**(2): 394–398.
- 1989. Zoogeographical relationships of stomatopod Crustacea from the northern Arabian Sea. *Marine Science of the Arabian Sea Proceedings* **10**: 113–119.
- 1990a. Stomatopod Crustacea from the Persian Gulf, with the description of a new *Manningia*. *Steenstrupia* **16**(6): 93–108.
- 1990b. *Mortensenenus minus*, a new genus and species of coronidid stomatopod from Mauritius. *Journal of Crustacean Biology* **10**(1): 162–164.
- 1995. Stomatopod Crustacea of Vietnam: the legacy of Raoul Serène. *Crustacean Research, Special No. 4*: 1–339. The Carcinological Society of Japan. Shimoda Printing, Kumamoto, Japan.
- Manning, R. B. and T. Y. Chan. 1997. The genus *Faughnia* from Taiwan, with the description of a new species (Stomatopoda: Parasquillidae). *Journal of Crustacean Biology* **17**(3): 546–554.
- Manning, R. B. and D. K. Camp. 1993. Erythrosquilloidea, a new superfamily and Tetrasquillidae, a new family of stomatopod crustaceans. *Proceedings of the Biological Society of Washington* **96**(2): 85–91.
- Manning, R. B. and R. G. Garcia. 1982. Notes on species of *Coronidopsis* (Crustacea, Stomatopoda, Eurysquillidae). *Journal of Crustacean Biology* **2**(4): 593–599.
- Miers, E. J. 1880. On the Squillidae. *Annals and Magazine of Natural History* **5**: 1–30, 108–127.
- 1884. Crustacea. In: Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. “Alert,” 1881–2, pp.178–322, 513–575, pls. 18–35, 46–52.
- Milne Edwards, A. 1868. Observations sur la faune carcinologique des Iles du Cap Vert. *Nouvelles Archives du Muséum d’Histoire Naturelle, Paris* **4**: 49–69, pls. 16–18.
- 1873. Descriptions de quelques Crustacés nouveaux ou peu connus provenant du Musée de M. C. Godeffroy. *Journal du Muséum Godeffroy* **4**: 77–88, pls. 12, 13.
- Milne Edwards, H. 1837. Histoire naturelle des Crustacés, comprenant l’anatomie, la physiologie et la classification de ces animaux **2**: 1–532. Atlas: 32 pp, pls. 1–14, 14 bis, 15–25 bis, 26–42. Roret, Paris.
- Moosa, M. K. 1973. The stomatopod Crustacea collected by the Mariel King memorial expedition in Malaku waters. *Marine Research in Indonesia* **13**: 1–30.
- 1975. Notes on stomatopod Crustacea from Seribu Islands and adjacent waters with a description of a new species. *Marine Research in Indonesia (Penelitian Laut di Indonesia)* **15**: 1–20.
- Moosa, M. K. 1986. [for 1985] Stomatopod Crustacea. Résultats du Campagnes MUSORSTOM I & II Philippines, 2. *Mémoires du Muséum National d’Histoire Naturelle, Paris, séries A, Zoologie* **133**: 367–414.
- 1991. The Stomatopoda of New Caledonia and Chesterfield Islands (in) Richer de Forges (ed.) *Le benthos de fonds meubles des lagons de Nouvelle-Calédonie* **1**: 149–219. Editions de l’ORSTOM, Paris.
- Müller, F. 1886. Zur Crustaceenfauna von Trincomali. *Verhandlungen der Naturforschenden Gesellschaft in Basel* **8** (1): 470–479, pl. 4.

- Naiyanetr, P. 1980. Stomatopoda of Thailand. Chulalongkorn University, Bangkok. 95 pp.
- 1983. [for 1982] Two stomatopod crustaceans from the Gulf of Thailand with a key to the genus *Carinosquilla* Manning, 1968. *Senckenbergiana biologica* **63**(5/6): 393–399.
- 1987. Two new stomatopod crustaceans from Thailand with a key to the genus *Manningia* Serène, 1962. *Crustaceana* **53**(3): 237–242.
- 1989. *Siamosquilla hyllebergi*, a new genus and new species of stomatopod crustacean from Thailand. In: E.A. Ferrero (ed.). *Biology of Stomatopods, Selected symposia and monographs*. U.Z.I., vol. 3, pp. 281–284. Mucchi, Modena.
- 1998. Checklist of Crustacean Fauna in Thailand (Decapoda and Stomatopoda). *OEPP Biodiversity Series* **5**: 1–161.
- Naiyanetr, P., S.T. Ahyong and P.K.L. Ng. 2000. Reinstatement of *Carinosquilla thailandensis* Naiyanetr, 1983, with first record of *Alima orientalis* Manning, 1978, from the Gulf of Thailand, and notes on *Cloridina pelamidae* (Blumstein, 1970) (Stomatopoda: Squillidae). *Crustaceana* **73**(10): 1291–1295.
- Nobili, G. 1903. Contributo alla fauna carcinologica di Borneo. *Bollettino dei Musei di Zoologia ed Anatomia comparata della R. Università di Torino* **18** (447): 27–32.
- Odhner, T. 1923. Indopazifische Stomatopoden. *Göteborgs kungl. Vetenskaps-och Vitterhets-Sämhalles Handlingar* **27**(4): 1–16, pl. 1.
- Pfeffer, G. 1888. Übersicht der von Herrn Dr. Franz Stuhlmann in Ägypten, auf Sansibar und dem gegenüberliegenden Festlande gesammelten Reptilien, Amphibien, Fische, Mollusken und Krebse. *Mitteilungen aus dem Hamburgischen zoologische Museum und Institut* **6**: 28–35.
- Pocock, R. I. 1893. Report upon the stomatopod crustaceans obtained by P. W. Bassett-Smith, Esq., Surgeon R. N., during the cruise, in the Australian and China seas, of H.M.S. 'Penguin,' Commander W. U. Moore. *Annals and Magazine of Natural History, series 6*, **11**: 473–479, pl. 20B.
- Roxas, H. A. and E. Estampador. 1930. Stomatopoda of the Philippines. *Natural and Applied Science Bulletin, University of the Philippines* **1**(1): 93–131.
- Serène, R. 1950. Deux nouvelles espèces Indo Pacifiques de Stomatopodes. *Bulletin du Muséum National d'Histoire Naturelle, Paris, séries 2*, **22**(5): 571–572.
- 1954. Observations biologiques sur les stomatopodes. *Mémoires de l'Institut Océanographique de Nhatrang* **8**: 1–93, pls. 1–10.
- Tate, R. 1883. Descriptions of some new species of *Squilla* from South Australia. *Transactions and Proceedings of the Royal Society of South Australia* **6**: 48–53, pl. 2.
- Tirmizi, N. M. and R.B. Manning. 1968. Stomatopod Crustacea from West Pakistan. *Proceedings of the United States National Museum* **125**: 1–48.
- Tiwari, K.K. and S. Biswas. 1952. On two new species of the genus *Squilla* Fabr., with notes on other stomatopods in the collections of the Zoological Survey of India. *Records of the Indian Museum* **49**(3–4): 349–363, figs. 1–5.
- Tweedie, M. W. F. 1935. Two new species of *Squilla* from Malayan waters. *Bulletin of the Raffles Museum* **10**: 45–52, pl. 1.
- White, A. 1849 [for 1848]. Description of two new species of Crustacea. *Proceedings of the Zoological Society of London* **15**: 144, pl. 6 [also published in *The Annals and Magazine of Natural History, series 2*, **4**: 381–382, 1849].
- 1851 [for 1850]. Descriptions of two species of Crustacea in the British Museum. *Proceedings of the Zoological Society of London* **18**: 95–97, pls. 15, 16.
- Wood-Mason, J. 1875. [On some new species of stomatopod Crustacea]. *Proceedings of the Asiatic Society of Bengal* **1875**: 231–232 [untitled].
- Wood-Mason, J. and A. Alcock. 1891. Note on the result of the last season's deep-sea dredging, no. 21. *Natural history notes from H. M. Indian Marine Survey steamer 'Investigator,' Commander R. F. Hoskyn, R. N., Commanding. The Annals and Magazine of Natural History series 6*, **7**: 258–272.
- Wood-Mason, J. 1895. Figures and descriptions of nine species of Squillidae from the collection in the Indian Museum. *Calcutta*. 11 pp.